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So Red the Rose

POWER politics and chess have rather marked similarities. The rules of the game make no allowance whatsoever for good intentions, for ignorance or ineptitude, and a mistake can never be hidden or rectified. Spectacular sprints, emotional outbursts or even spitting at an opponent may dramatize the play somewhat but all too often weaken the chances of a final checkmate.

For two years now the United States and Russia have been engaged in a series of opening gambits in a diplomatic, political and ideological contest which may last for decades. Only belatedly has there been full realization that chess is almost as much a hallmark of the professional communist as are the cap and the bell-bottomed blue-serge suit. People in the United States are finding the subtleties of the game both irritating and confusing, but are catching on pretty quickly. And, of course, Mr. Molotov may wear out still a couple more Secretaries of State. But this evil totalitarian tide can pose no overwhelming threat, if there be a little more skill and boldness and confidence in the democratic yearnings of western Europe, along with self-discipline and abiding faith in the precepts of democracy here at home.

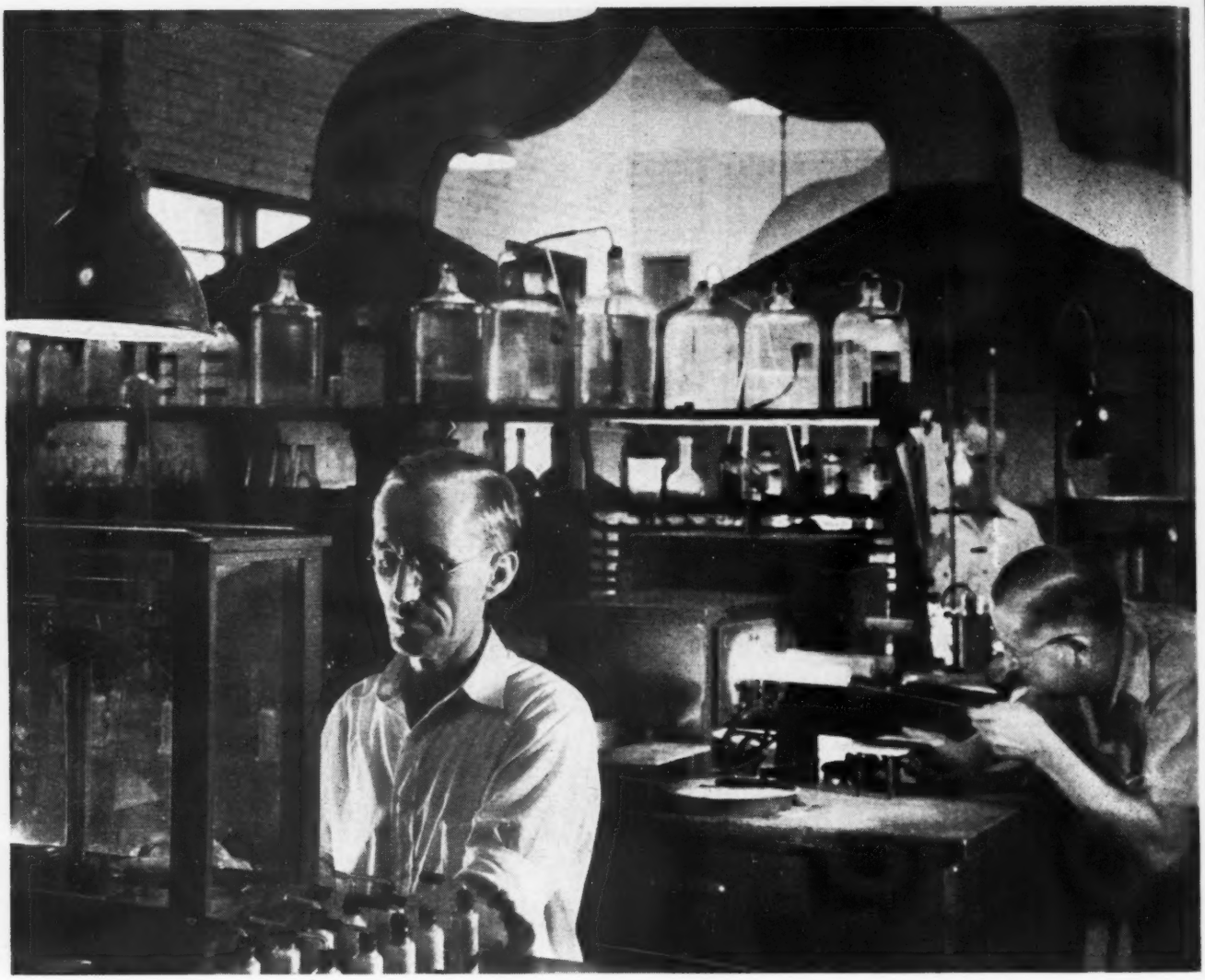
One serious and overriding danger is that, in this coming period of stress and great passion, this democracy should fall in the trap of imitating the intolerance, cynicism, fanaticism and bully-boy tactics of a police state—that there should be impatience with the spirit of free inquiry, free discussion, the conflict of laws, the fumbling of bureaucracy and the disagreements of leaders, all of which are the strength and heritage of democratic behavior. Still another danger is that the word "communism" should become the fall guy, the whipping boy—the illogical, feline and dissembling trick of begging the question for every social or political abuse, for every contradiction, frustration or clash of selfish pressure groups.

The very rare professional communist should be weeded out of labor unions and government service. But the root of fanaticism lies in impassioned anxiety that all government employees, all writers, all children, all motion pictures, everybody should think precisely the same thoughts in precisely the same manner. This prying into everyone's skull to flush out some deviation from a monolithic norm has an unhealthy resemblance to Japanese thought control. Uniformity is not in the American tradition—far more typical is the distaste for regimentation, glorification of personal freedom, and a general irreverence toward all of the various repositories of wisdom and power.

A fear-ridden, fanatical search for communist conspiracy in every minor by-way can so exhaust the searcher that little energy is left for the crucial battles to come. Right now, the motion picture industry is being combed for borers-from-within. Of course the constant diet of inanity in B-pictures could be a subtle form of sabotage, but investigators seem rather excessively concerned with the subversive aspect of a business man bumping a soldier from an airplane seat in "The Best Years of Our Lives"; or Ginger Rogers mouthing the line: "Share and share alike—that's democracy." As for witch hunts, the greatest New York newspapers just recently fell into the trap of blaming communists in the Relief Department, just because some destitute families were temporarily housed in third-rate hotels.

The newspapers could better have directed their energies and headlines to the precarious situation in Italy. There a minority government is perpetuating itself with practically all organized workers in opposition. What with widespread unemployment, and discredited remnants of the extreme right propped up by American dollars, the communists have an ideal culture in which to plant dissent and expand their power. Italy is the pivot around which swings the whole precarious balance of power of the Eastern Mediterranean and Near East oil fields. It would be unfortunate if the average Italian is presented with a choice between the extremes of pure light and utter darkness—in such situations men are prone to tumble wholesale into the folds of those faiths purporting to have the answers to all problems.

T. W. Lippert



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► Every year at about this time, viewers-with-alarm begin to worry over possible steel production losses due to hot weather. But expert control of heat cases by steel mill safety departments plus use of salt tablets and of candy containing dextrose and salt have reduced heat effects to a minor problem. Hot weather will have little perceptible effect on steel output this summer.

► High temperature aluminum bronzes are among the materials being ordered for rocket motor research.

► "Pittsburgh Plus"—the system whereby all steel was sold on the basis of freight from Pittsburgh no matter where it was made—went off the books in 1924, not 1938 as some publications have recently stated. One large steel company still operates under a Federal Trade Commission order banning its use, even though that company abandoned it more than 24 years ago.

If it were reintroduced, some of those now advocating "Pittsburgh Plus" would be among the first to insist on the present basing point system when supply again exceeds demand.

► Built along unorthodox lines and employing a hitherto unused electromagnetic principle is a line of tiny electric motors, the smallest of which weighs less than 1/28 oz and runs at 7000 rpm. A British firm is building them now and expects to make 5 million next year. Scientific instruments, toys, models, displays, fans and windshield wipers are among probable uses.

► Addition of 6 pct silver to a magnesium alloy steps up its tensile strength to 75,000 psi but producers are not pushing it commercially because of its poor resistance to corrosion.

► Blanketing the surface of chromic acid plating solution with floating plastic tubes is reported to save half to three fourths of the solution ordinarily lost. It also reduces heat loss in the bath and reduces dangerous air pollution. The tubes, 3-in. long and closed at the ends to make them float, are extruded of Dow Styron.

► With an ingenious production line setup one operator can simultaneously produce a circular flange, a square head and a 1-in. flat on $\frac{1}{4}$-in. round spreader bars used in concrete reinforced construction. Production is at the rate of 30 pieces per min.

► It is predicted that American machine tool exports to Latin America will exceed $20 million in value this year.

► The Swedish Government's atomic energy commission has recommended construction of a million dollar plant to conduct atomic energy research and build an atomic power plant. Sweden has already begun the exploitation of uranium deposits.

► Aluminum wire producers are having a try at the bale tie market. Despite the higher cost of aluminum wire contrasted with steel they say the saving in hay and straw loss would be worth it.

► The propulsive thrust from the tailpipe nozzles of jet engines can be boosted as much as a third with an after burner, according to Ryan Aeronautical Co., which has just developed it for the Navy. It can be used where extra power is needed, and may be invaluable in breaking through the compressibility barrier.

► While the British have been converting steam locomotives to burn oil they are now slowing down on the work because they can't count on enough oil. But the French, who must buy either oil or coal, are now changing over 620 locomotives to burn fuel oil.

► The French Iron & Steel Research Institute, established in 1944, has a $100,000 laboratory under construction at St. Germain. It is also studying the possibilities of building a steel mill and blast furnaces in Morocco.

► Payments to employee annuity incentive plans are a legitimate deduction from gross income for tax purposes, according to a U. S. Circuit Court of Appeals decision. The decision, in favor of Lincoln Electric Co., reversed a tax court ruling, and observed that the latter's action had threatened other incentive plans.

► Latest in lagoon fashions is stainless steel rowboats selling for about $175. They are built of 18-8 stainless, type 302, of welded and riveted construction.

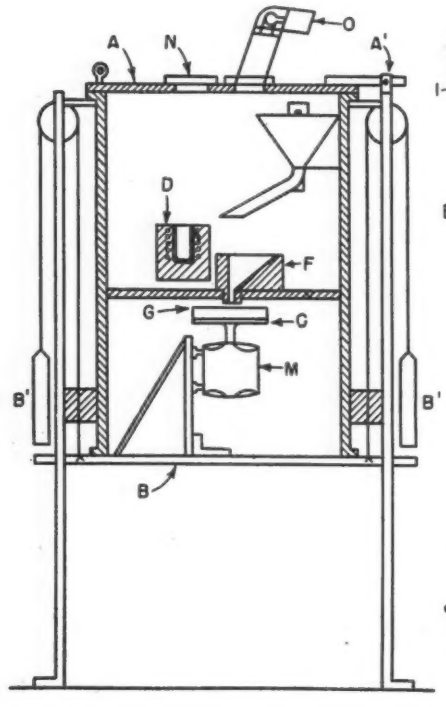
Producing High Purity Metals With Vacuum

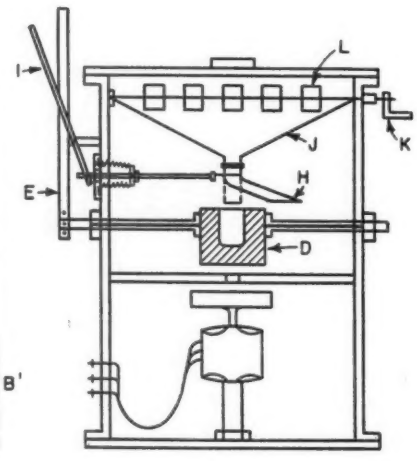
By J. D. NISBET
Research Laboratory, General Electric Co., Schenectady

Use of vacuum melting as a means of producing gas-free metal is arousing considerable interest among metallurgists. Described herein is a vacuum melting system in which a centrifugal casting operation is performed, and in which an arrangement is provided for loading and making additions to the furnace without disturbing the vacuum. The step-by-step procedure in producing a 6-lb "ingot" under less than 50 microns pressure, together with precautions to be observed in making a heat, is outlined by the author.

VACUUM melting is growing popular in laboratory work because it is one of the best methods known for producing high purity metals and alloys. Just the words "vacuum melting" are not sufficient to describe the process, however. Something must be said about the degree of vacuum, which is measured in terms of pressure.

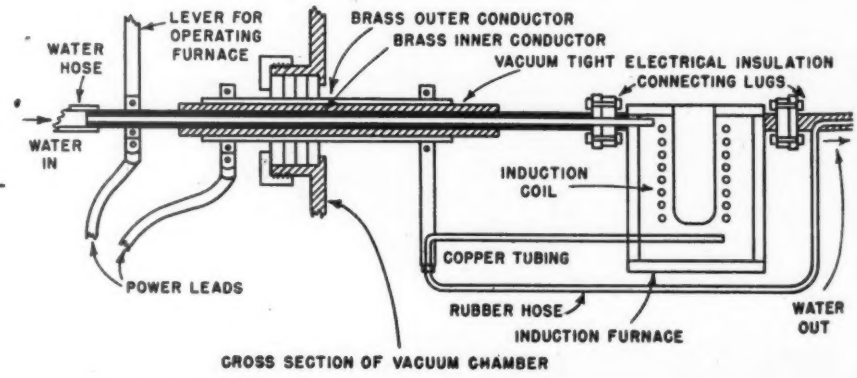
Atmospheric pressure, as measured on the micron scale, is 760,000. In vacuum systems a pressure of 0.7 micron, or one millionth of atmospheric pressure, is not uncommon. Pressures of 7 to 70 microns, 0.00001 to 0.0001 of atmospheric pressure, are obtained in the system described in this article in which a centrifugal casting operation is also performed. Pressures of less

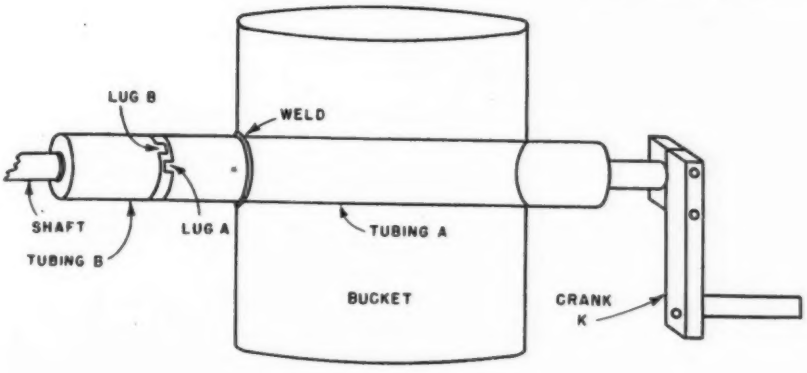




LEFT
FIG. 1—Vacuum melting and casting machine.

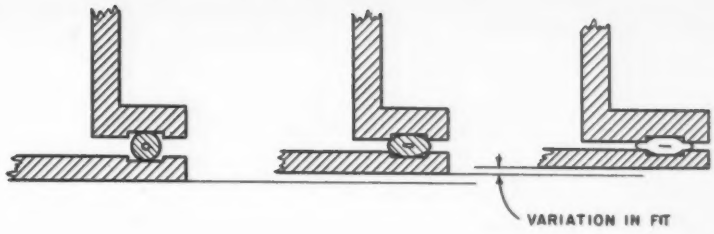
BELOW
FIG. 2—Detailed sketch of power and water leads into chamber.





BELOW

FIG. 4—Detailed sketch of bucket dumping arrangement.



ABOVE

FIG. 3—Sketch showing how variations in contact surfaces can be overcome by using tubular gaskets.

than 1 micron are consistently obtained in a small system used in the research laboratory of General Electric Co. for melting quantities of about ½ lb. The minimum pressures possible on any system are primarily dependent on pumping capacity and design.

The two types of pumps used almost entirely in vacuum melting systems are mechanical pumps and oil diffusion pumps. The mechanical pumps are used for roughing down, i.e., to reduce the pressure from atmospheric down to 100 to 1000 microns, and for backing up the oil pumps which usually operate against a back pressure or fore pressure of 100 to 1000 microns. The oil pumps are used for pressures below the mechanical limit. Sometimes compound mechanical pumps can be used at pressures around 10 microns. Conventional pumping systems, therefore, consist of two stages, a roughing stage and a fine stage. Frequently the minimum pumping speed occurs at the transition pressure between the two stages, because the mechanical pumps are approaching the lower limit in pressure at which they are efficient, and the oil pumps are above the pressure at which they reach maximum efficiency. Due to this low speed valley at the transition pressure between pumps, a long time is often required to reach the minimum pressures.

If minute leaks exist in the system, it might be impossible to reach the minimum pressures in spite of the fact that the capacity of the oil pump might be capable of handling such leaks at the pressure corresponding to its maximum speed. This problem existed in the original design of the system described. It was overcome by doubling the capacity of the mechanical pumps, which reduced the minimum pressure for a given volume, and by raising the pressure of the oil pump with booster jets, changing to a higher pressure oil, and employing a larger capacity fore pump.

An ideal system would consist of three rather than two stages; (1) a roughing stage, (2) a transition stage, and (3) a fine stage. For the transition stage either an oil booster pump designed to operate at the intermediate pressure or a compound mechanical pump could be used. In designs where rapid melting cycles and very low minimum pressures are desired, three pumping stages should be employed.

A vacuum melting system, like a machine tool, is no better than the design. It is important to construct the chamber from a dense material, free from microporosity which might cause leaks; this, in general, eliminates castings. The inside surface of the chamber should preferably be polished, and all surfaces should be accessible for cleaning. Materials which vaporize when slightly heated should be avoided. For this reason it is usually impractical to use many vacuum seal greases that are exposed to radiant heat from the molten metal. All moving parts through glands or bellows and valves are potential sources for leaks and should be minimized. Gasket surfaces should be carefully prepared, and it is often better to countersink the gasket for partial support.

As in any design, certain compromises between the ideal and the practical are necessary. For example, in the system described here, the motor for the centrifugal casting machine is enclosed in the vacuum chamber. The motor insulation and lubrication are sources of gas at low pressures. To eliminate these potential pressure sources would have involved mounting the motor outside the chamber and transferring the motion through a shaft in a sealed gland. The design of a practical gland which would be trouble-free in sealing around a high-speed shaft operated 5 to 10 min an hour was considered more of a problem than maintaining a low pressure in the chamber with the motor there. If pressures below 1 micron are desired, perhaps this is not the correct solution.

Ceramic materials so far have not been completely eliminated in melting metals and they, too, are a source for gases or pressure. They are especially harmful when fresh, and when completely degassed tend to become powdery, dry and weak—dehydrated so to speak.

Vacuum melting is not a cure-all. It is usually necessary, in melting active materials, to deoxidize, in spite of the fact that the degree of oxidation during melting is markedly reduced. It is important, therefore, to provide means for making additions to the melt without disturbing the vacuum. This is provided for, in the system discussed, by means of a mechanical arrangement. It has been done by many other means. One of the most ingenious ways is to hang the desired addition above the melt on a wire which is electrically connected to the outside of the chamber. The wire is burned away by resistance heating, and the addition drops into the melt.

A flexible power source is important in vacuum melt-

ing. Electric resistance heating, induction heating, and heating by an electric arc, have been used by various investigators. The important things to watch in the design are the voltage and distance between terminals and windings to avoid arcing. Conventional induction heating coils have been used with no arcing troubles except when the metal temperature was allowed to get too high and cause excessive vaporization. This experience has been with frequencies of both 960 cycles and 10,000 cycles at 440 v. Incidentally, the higher frequency is much better for melting small particles of metals, but the lower frequency is much better for stirring the melt.

Fig. 1(A) shows the cross-section of a vacuum machine capable of melting and centrifugally casting 6 lb of metal, at pressures less than 50 microns, in 1 hr cycles. Fig. 1(B) shows a section at 90° from 1(A). The top cover *A* is hinged at *A'* for access to the top chamber. The centrifugal machine is fastened to the bottom cover plate *B*. The plate is counterweighted so

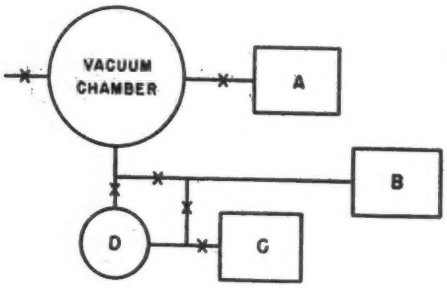


FIG. 5—Vacuum pumping arrangement. *A* and *B* are 100 cfm mechanical pumps; *C* is a 20 cfm mechanical pump and *D* is a 500 liter per sec or 200 liter per sec oil diffusion pump.

that it can be lowered easily to expose the turntable. The induction melting furnace is mounted on two shafts or trunnions which extend to the outside of the chamber through two sealed glands. Metal is poured by rotation of the furnace with the lever *E*. The lever arm is connected to one of the supporting shafts as shown. Molten metal passes through the ceramic funnel *F* into the mold *G*.

Fig. 2 shows the detailed scheme for bringing water and power in and out of the chamber. Both power leads are brought in through conducting shafts separated from each other with vacuum-tight insulation. Inside the chamber the conductors are connected to opposite ends of the induction coil. The inlet water for coil cooling is brought in through a hole in the center of the inner electrical conductor. The cooling water passes out through a hole in the opposite shaft. The concentric conductor is necessary to avoid heating of the metal chamber, which would result if the power leads came in through opposite sides of the tank.

The chamber is 24 in. in diameter. It is difficult to maintain perfectly flat flanges in a cylinder of this size. The cover plates also tend to warp, and an irregular fit between cover plates and flanges results. The tubular rubber gaskets illustrated in fig. 3 were designed to correct the irregularities. The variation in compression on this type of gasket can be almost equal to the diameter of the hole and, if properly supported, it will still act as an effective vacuum seal.

An arrangement for loading and making additions to the furnace without disturbing the vacuum is provided. The chute *H* (fig. 1) is pivoted at the bottom of the funnel *J*. The chute can be rotated into position above the furnace *D* by movement of the lever arm *I*. The shaft connecting the chute and lever travels through a bellows in the side of the chamber. A passage is opened from the funnel *J* to the crucible. Metal is emptied into the funnel from the bucket *L* by rotation of the crank *K*, and metal falls down a directed path into the crucible.

When the first bucket *L* is upside down, the adjacent bucket is engaged as shown in fig. 4. Lug *A* mates with lug *B* and another half revolution of the crank will empty the second bucket, which is welded to the tubing *B*. Two and one-half revolutions of the crank will empty the five buckets one after the other. The crank shaft is connected directly to tubing *A*, but not directly to tubing *B*, etc The mechanism must be unwound after each cycle or all buckets will rotate together. After loading or making additions to the crucible, the chute is moved back to the side of the chamber so that it will not interfere with the pouring operation

A three-phase, 1200-rpm, ½-hp induction motor is used to power the centrifugal casting apparatus. With a gearing arrangement between the motor and turntable, not shown in the drawing, mold speeds of 600, 1200, or 2400 rpm can be used.

In the top cover plate, fig.1, are four 3-in. glass-covered portholes, *N*. Three are used for visual observation, and an optical vacuum tube thermocouple *O* looks through the fourth. It is very important to provide adequate visual observation and a metal-temperature measuring device in vacuum melting.

The power source used for melting is a 50-kw, 10,000-cycle, water-cooled, motor-generator set. Only 25 kw is necessary to melt 6 lb of metal in 5 to 10 min. The maximum temperature that can be reached has not been checked, but is known to be above 3632°F.

The vacuum pumping arrangement is shown in fig. 5. Two 100-cfm mechanical pumps, one 20-cfm mechanical pump, and either a 500 liter per sec oil diffusion pump or a 200 liter per sec booster pump are employed. The pumps are connected so that one 100-cfm mechanical pump can be used to back up the oil pump.

The operation of this vacuum melting and casting machine is relatively simple. With the bottom cover plate in the lowered position, a mold is placed on the turntable and the assembly raised into the chamber. The slight pressure resulting from the counterweights holds the plate tight against the flange. Three to 4 lb of the 6-lb charge is loaded directly into the melting crucible and the balance is loaded into one or more of the charging buckets. If late additions are to be made, they are loaded into a separate bucket which can be emptied last. The top plate is closed. The weight of the top plate is sufficient to seal it tightly enough so that evacuation can be started. The system is "roughed down" to around 200 microns with the two large mechanical pumps. Power is turned on and the charge is slowly heated while the pressure continues downward.

At 100 to 150 microns the oil pump valve is opened. One of the two large mechanical pumps is switched from directly to the chamber, to back up the oil pump. The small mechanical backup pump can be either left on or turned off. It is required only when the large pump is connected directly to the system. By the time the melt is red, the pressure is down to less than 100 microns. One roughing pump is usually left connected directly until the metal melts and is degassed—50 to 100 microns. Then the second roughing pump is turned off and only the oil pump, backed up with one large

mechanical pump, is used at the lower pressures. Final pressure between 10 and 5 microns can be achieved in a few minutes. Before additions are made through the chute arrangement described above, the metal is allowed to solidify. This is essential to avoid violent spitting caused by the evolution of gases from the cold metal added.

After all additions are made and the molten metal is quiet, the power is again turned off until the heat solidifies. The solidification time is recorded and the charge reheated to 257°F above the melting point and poured into the mold on the rotating turntable below. The casting is allowed to cool a few minutes in the vacuum before the chamber is opened and recharged. Less than 1 hr is required for the complete cycle.

Several hundred alloys have been melted and cast in the machine described. A pressure of 3 microns has been attained under cold conditions, and a minimum pressure of 4 microns with molten metal.

Machining Operations Eliminated by Formed Tubing

DESIGNERS faced with the necessity of using accurately sized steel bushings and spacers have, for the most part, automatically specified that these be produced from standard steel tubing, a decision involving cutting off, chamfering, burring and, frequently, turning and boring for exact size. Moreover, oil holes, oil grooves, notches or other openings must then be milled piece by piece in special fixtures or drilled after assembly.

All these time-consuming operations can, however, be avoided by the use of formed bushings made from flat stock, according to National Formetal Co., Inc., Cleveland. Spacer tubes, bushings, bearings, ferrules and tubes in short lengths of most metals or alloys, it is said, can be furnished to specification. Tolerances on steel bushings and spacer tubes are ±0.005 in. on the ID +0.010 and −0.000 on the OD for any given OD specification and ±0.010 in. on the length. If relatively small quantities are involved, it is advisable to hold to standard sizes, since die costs are high and special sizes would not be economical.

Thickness of the original strip stock is, of course, critical and while this is usually purchased to close specification limits, it can, if necessary, be passed through pinch rolls for exact sizing. The butted joints are commonly made square, but diagonal or envelope seams can be incorporated if desired. ID and OD chamfers may be had on one or both ends of the tubes. All of these features give improved flexibility of application with no additional cost except in the original tooling, since they are incorporated into the die and applied to the stock while this is still in the flat state. This applies also to notches and cutouts of any shape or size as shown in fig. 1. The part on the left is a sleeve for a gas stove pilot and incorporates both round and slotted holes; that on the right is a spacer for link chain made from 11 gage stock and incorporating a wide notch at each end and a rectangular opening at the center, together with an inside and outside chamfer. Both linear and angular spacing of these cutouts can be held exact, and again without extra cost, since they involve only the addition of suitable punches in the original die set.

Another interesting feature of this method of fabrication is the fact that special forms can be produced on either or both ends as shown in fig. 2. To produce such a form from tubing would involve some awkward and costly machining operations.

In addition to the steel spacers, bronze and other copper alloy bushings and bearings are available. These are fabricated by the same methods, but because of the nature of their applications they are held to closer limits, namely, ±0.0005 in. OD and ±0.001 in. ID and ±0.010 in. in length. The inside can be supplied ball indented as shown in fig. 3 for improved lubrication, and oil grooves, holes and cutouts can be furnished as in the case of the steel tubes. An interesting variation of the ball indenting consists of placing this on the OD as shown in fig. 4, when using the bushing as an insert for plastic molding or diecastings. This type of anchorage is said to give much greater holding power than the conventional knurl since the small pockets thus formed are not interconnected.

For bearing applications the rolled material has been found preferable to the conventional cast type since it is possible to make use of much lighter sections to carry an equal load, and the overall weight and cost may thus be materially reduced.

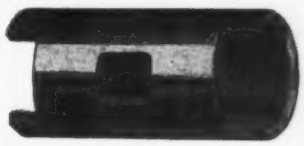


FIG. 1—Gas stove pilot tube (left) and link chain spacer (right) are produced with slots or rectangular openings at no additional cost beyond the addition of suitable punches in the oringal die set.

FIG. 2—Special regular or irregular forms can be produced on either or both ends without costly machining operations.

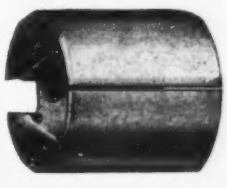


FIG. 3—Oil grooves and ball identations can be applied to bronze bushings while still in the flat state.

FIG. 4—Ball indentations on the OD of bushings to be used as inserts in plastic molding or diecasting assure greater holding power than conventional knurling.

Repair

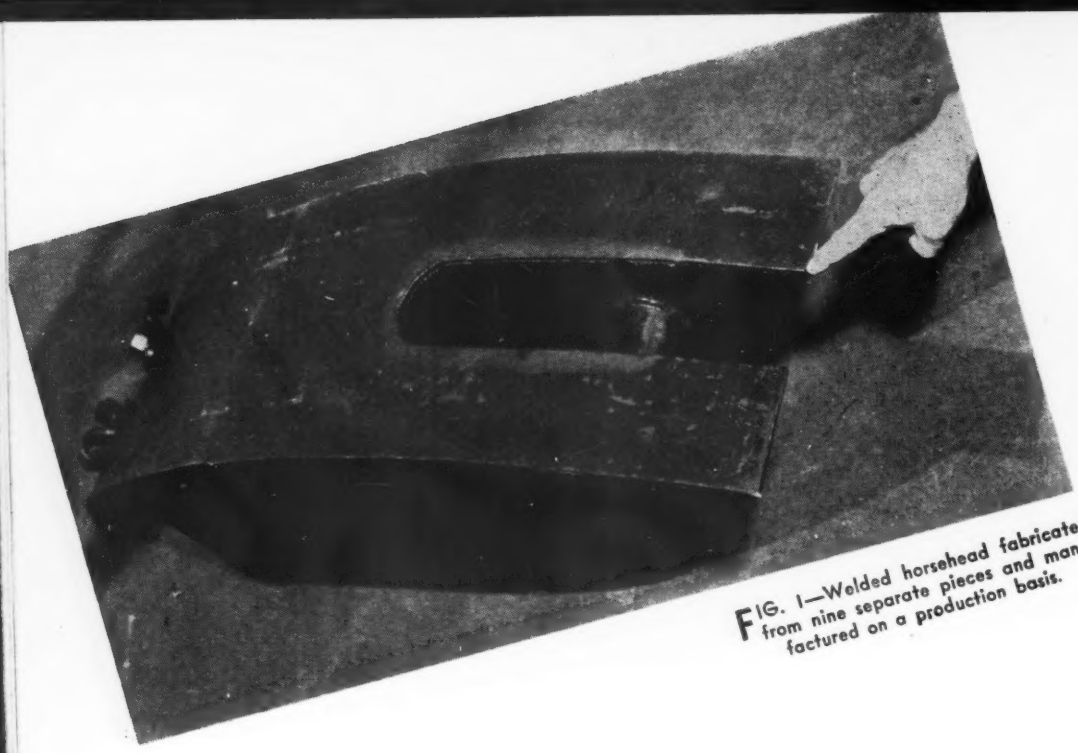


FIG. 1—Welded horsehead fabricated from nine separate pieces and manufactured on a production basis.

How current repair work can be handled in an average size production welding shop with a minimum of interference with regular production is described herein. Suggestions are given for setting up a system of work handling and for classifying types of repair work according to material. Some interesting information is included on the repair of cast iron parts, with suggestions on how to avoid cracking and distortion.

IN order to do welding on a paying basis in a highly competitive field, a welding department must be organized along the same general lines as any other efficient production department. There must be coordination of the operations and flow of the materials, so that the welders can spend their time in welding. If their productive capacity is artificially limited by makeshift handling apparatus or impromptu design problems, costs will skyrocket. This is especially true in a weld shop operated in conjunction with machining departments. There is frequent need of welding as a means of reclaiming worn or damaged equipment which would otherwise be scrapped. However, the very ease with which these repairs may be made often contributes to a lack of systematizing of repair work and results in unnecessarily high welding costs.

It is the purpose of this article to show how a production welding shop can be organized to handle individual and often specialized repair jobs without interfering with production routine. Since the department from which the following information has been obtained is not large, it must be borne in mind that the ideas set forth are geared to an average size welding shop. It is taken for granted that the number of welders employed is based upon the production desired, and that repair work is sandwiched into the productive schedule so that it will interfere the least with the production welding.

To give a better understanding of the way in which repair and maintenance work can be interspersed with production welding, a brief outline will be given of the production routine. The weld shop in which this work was done handled a variety of parts, most of them for oilfield equipment. Typical is the horsehead shown in fig. 1 and the pitman spreader shown in fig. 2. These subassemblies consist of nine pieces welded together, in the case of the horsehead, and 14 pieces in the pitman spreader. In the fabrication of both of these examples, as well as others, it is necessary to make layouts for templates, cut out, and then weld the subassemblies. Weekly production is brought to the highest level by fabricating only one or two major subassemblies at a time. Not only does this limit the number of templates, jigs and fixtures needed in the shop at any one time, but also allows simplification of welding to the point where variables of the human element are reduced to a minimum.

When compared to a machine shop, there is one major difference in the production of large units in a well organized but small weld shop. That is, the work is arranged in an efficient order and the welders move from unit to unit, rather than the work moving. This technique reached a high level of perfection during the war in the building of ships and has not been changed materially for jobs like those shown.

Procedures In A Production Weld Shop

By ORLO E. BROWN and CHARLES R. CAUSEY
Western Gear Works,
Lynwood, Calif.

It is especially desirable in such a production weld shop to have developed repair procedures for handling a great variety of repair jobs for the machining departments. Two considerations are of primary importance: (1) To get good welds and (2) at the same time be foolproof without requiring the welder to make a project out of each job in order to give a good repair. In other words, repair procedure must be standardized so that miscellaneous jobs can be handled efficiently. A description of the methods used should be helpful to shops where details have not yet been worked out satisfactorily.

In spite of the great variety of repair jobs which have been encountered in this shop, it is possible to classify all of them under four general headings, according to the composition of the metal components. These are: (1) Cast iron, (2) carbon steel. (3) low alloy steels of the SAE (or NE) types, and (4) stainless steel.

The entire handling of a repair job is based upon its identity as one of the four types. The standardized procedure for that type is then followed, and the job is completed with a minimum of interference with production.

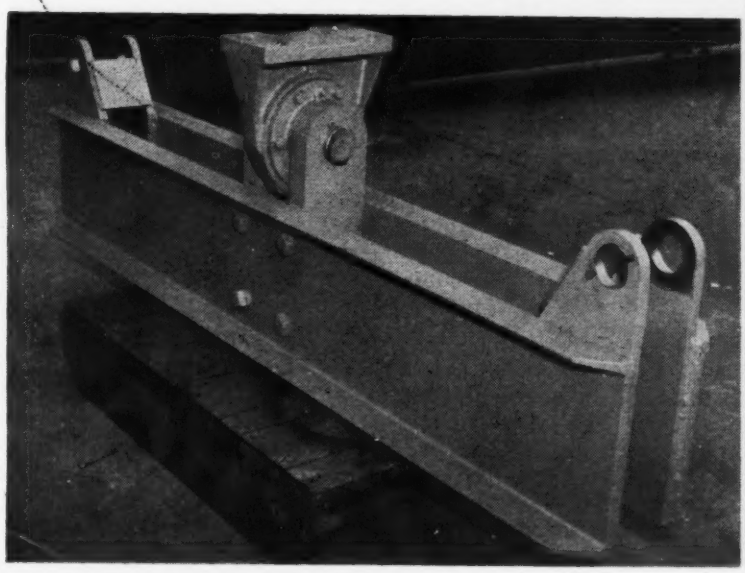
No difficulty has been experienced in classifying jobs. The welder has several things to aid him. If the parts are from production, there is the engineering blueprint with all necessary data. Both cast iron and stainless steel are quite distinctive in characteristics and are easily typed. Only one kind of work

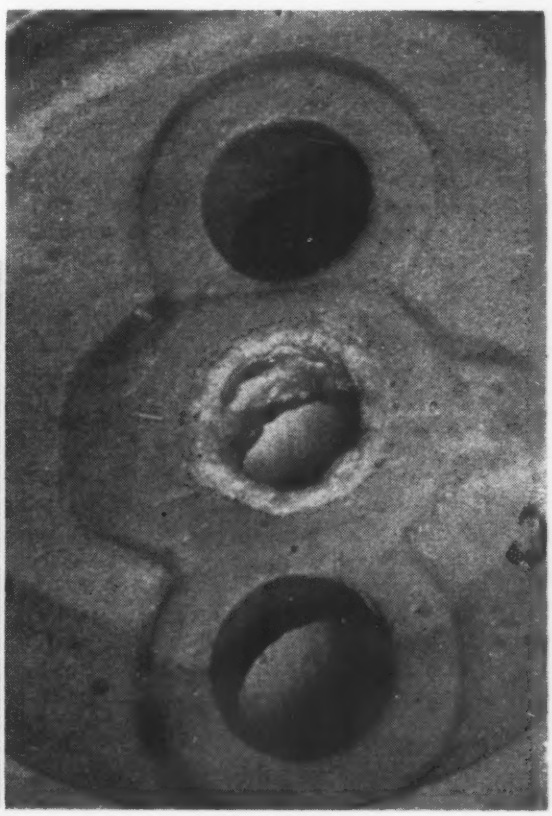
RIGHT

FIG. 3—Repair weld in cast iron. Opening for shaft bearing has been built up for remachining.

BELOW

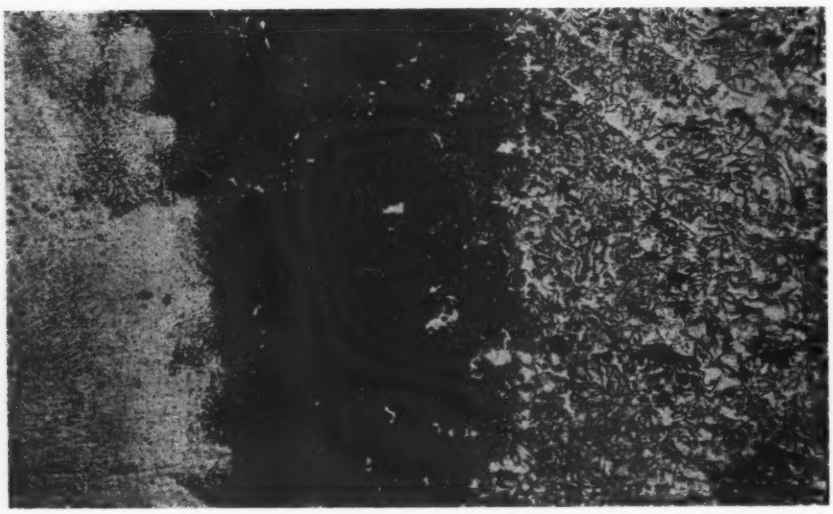
FIG. 2—Pitman spreader used in oilfield work, assembled chiefly by welding and consisting of 14 separate pieces.





offers a problem, that is maintenance work such as the repair of a steel machine part where there is nothing to tell the welder what kind of steel it is. In such cases the classification of type of work is made by a simple rule: If the part is subjected to moderate or heavy loads, it is assumed to be a low alloy steel. If required to carry only low loading, or if of a structural nature, it is considered as carbon steel. With the material typed, there need be no delay in making the repair by using the set procedure.

Cast iron is welded with a special rod high in nickel. The results can be quite as satisfactory as an original perfect casting. Fig. 3 shows a complete buildup of both faces of the central opening for a main shaft bearing. Since there are nearby areas which have been machined to tolerances, preheating cannot be used without danger of unacceptable distortion. In such instances, where tolerances must be held, the cast iron should be kept as cool as practicable in order to keep the heat-affected zone small. The arc should be started away from machined areas, and broken back of the weld puddle to lessen the possibilities of hard spots. It will be noted that considerable peening has been employed on the weld while it was still hot. No cracks developed and the excellent bond is shown in fig. 4. Note the blending of the weld and base metal.



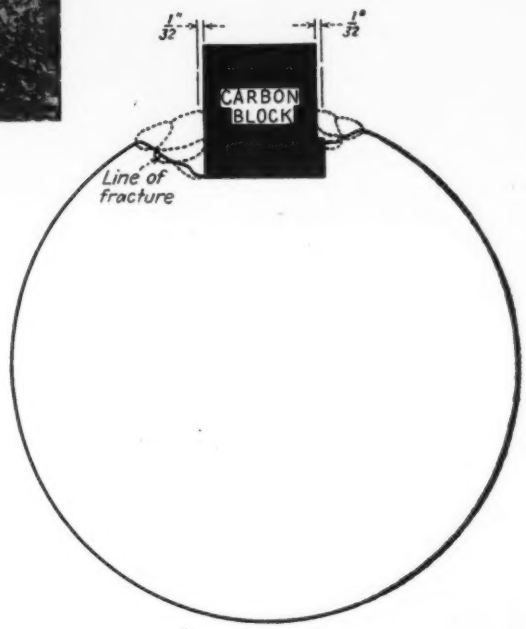
LEFT

FIG. 4—Cross-section of weld in cast iron (50X, acid ferric chloride etch). Light area at left is weld deposit. Dark central zone is heat-affected cast iron, and lighter area at right is unaffected cast iron.

o o o

BELOW

FIG. 5—Method of building up a broken keyway by using a carbon block to reduce machining, leaving 1/32 in. of weld metal for sizing keyway.



The ultimate test of weld quality in a cast iron case comes when the welding is on one side only and subsequent machining cuts into and out of weld metal. With sufficient peening of the weld, and using a high nickel rod, considerable success has been experienced in welding cast iron.

For welding carbon steel nothing can be added to the vast experience with mild steel rod which has already been recorded. However, it has been found that superior results are often obtained by using stainless steel rod, which offers advantages in that the weld has greater strength and percentage of elongation than one made with mild steel rod, and the welding characteristics are excellent. Fig. 5 shows a worn shaft built up with stainless rod. A carbon stick in the keyway saved time and subsequent remachining.

In welding alloy steels of SAE type, a welding electrode of the same general chemical properties should be used. This is especially important if the part is to be heat treated or carburized. There is only one exception to this rule that is worth notice. In some cases the repair is very shallow and one pass will do the job, even leaving material for machining. Such minor welds may be made with mild steel rod, since alloy pickup will result in a weld of low alloy content. Many alloy steels give trouble if they are welded without preheating. However, in repair work it has been found that there are often two factors which seriously limit or prevent preheating.

(1) The part may have finished dimensions which would be distorted by heating. These may be some distance from the weld, but subject to stresses if a large portion of metal is heated at the weld.

(2) The repair may be in a recess or near finished surfaces where heat cannot be adequately directed.

In such cases successful repairing has been accomplished by running the first pass hot and slow. The ideal amount of heat is that which preheats ahead of the puddle sufficiently to prevent further cracking and still does not result in either of the two objections listed above. Sometimes this cannot be done. Distortion and damage to machined surfaces simply cannot be risked, so preheating is in-

adequate and a crack forms in the first pass. The rest of the passes are then run over any crack which forms in the metal of the first pass. The only precaution which must be taken is to assure enough penetration with the second pass to go below the crack in the preheating pass. Careful checks have shown that no trace of these first cracks remain in the finished weld.

Welding of stainless steel needs no discussion here. The only point which is sometimes overlooked is that the part must be stabilized after welding if the weld area is to regain its stainless properties. When heating of the entire repaired part is not feasible, reasonably good results may be obtained on unstabilized welds if welding rod is used which contains titanium or columbium.

One goal should be kept in the welder's mind through all repair work, namely, welding for permanence. The old idea that "if it breaks, bring it back and we will do it again," has resulted in too many injuries, damage to machines, and loss of time to be tolerated today. If the welder classifies the metal and repairs it according to the type of stock, the part should be at least as good as new, and the time taken from production should be a minimum.

Impact Strength of Alloy Steel

PREDICTION of Izod impact strength in steels of normal commercial quality was discussed in the paper entitled "The Izod Impact Strength of Heat-Treated Alloy Steel," presented at the recent annual AIME meeting in New York by W. Crafts, chief metallurgist, and J. Lamont, research metallurgist, Union Carbide & Carbon Research Laboratories, Inc., Niagara Falls, N. Y.

The study of the relation of hardness to impact strength was based on test data derived from 24 heats which included the following SAE and AISI steels: 1020, 1030, 1040, 1340, 3310, 3316, 4320, 4330, 4340, 8620, 8630, 8640, 8720, 8730, 8740, 9310, 9317, 9440, 9917, and three high alloy Cr-Ni-Mo steels.

The authors found that the Izod impact strength of quenched and tempered bars of fine-grained alloy steel up to 4 or 5 in. in diam may be calculated with an accuracy of $\pm$ 20 ft-lb. The Izod impact strength of fully hardened fine-grained alloy steel was said to be inversely proportional to the Rockwell C hardness and adversely affected by incomplete hardening on quenching. The grain size has an influence of the same order as that of the degree of hardening. In the particular alloy steels investigated, individual alloying elements did not exert an appreciable amount of specific control over impact strength. Maximum combinations of impact strength and tensile strength require that the steel be made fine grained and be fully hardened in quenching.

The carbon and alloy contents were found to affect impact strength indirectly by their effects on hardness in quenching and tempering. Both higher carbon and alloy contents tended to be beneficial by promoting a closer approach to full hardening. However, because carbon raised hardness to a greater degree than it increased hardenability, the higher carbon steels tended to develop relatively lower values of impact strength. Increase of alloy content in the lower carbon steels raises the tensile strength without sacrifice of impact strength.

By the use of methods for evaluating quenching rates, hardenability, tempered hardness, and Izod impact strength, the authors found it possible to predict strength and toughness for the final heat-treated condition in which steel is put into service. The principles for the selection of steel were outlined in the paper with respect to tensile and impact strength and the relative merit of commonly produced heat-treating types was estimated.

Bearings Made From Steel Wool

TO AVOID expensive machining operations in the design of a landing gear strut for which the requirements called for low cost and high efficiency, engineers at North American Aviation decided to make use of tubing and split fittings. The problem of securing the bearings in the strut, however, posed a difficult problem. The tube walls were too thin to permit attaching with screws, and the building up of nut sites with bosses was not practicable in this case. Brazing was tried, using various oil impregnated bearings, but these melted when subjected to heat treatment as an assembly. It was necessary, therefore, to find something that would braze, heat treat, and bond satisfactorily.

After long research and experiment, it was determined to use a material which would in no way change its normal characteristics during heat-treating process. Further research indicated only one available material which would lend itself to North American Aviation's requirements. This material proved to be properly selected steel wool, which maintains its physical characteristics even though heated to temperatures in excess of 2100°F. This material, when properly impregnated with copper bearing material, or other closely related bearing materials, formed the required bearing which could be used as a pressed unit or readily machined with standard equipment and tooling.

This bearing may be made either as a closely woven and relatively heavy section, or may be loosely packed and be relatively porous. This is possible because the steel wool will not alter its structure under any of the given loads for which it is designed.

Developed by L. H. E. Fox of the supervisory staff of the company's welding department, and known as the Foxite bearing, it possesses the advantages that it will withstand high temperatures common to friction bearing surfaces, and has the ability to withstand extreme cold and allow proper lubrication to the mating parts as long as a lubricant will flow. Furthermore, as a bearing material, it has all the desired compression and friction characteristics. The adhesion by brazing to the adjoining parts is such that the bearing may be considered as an integral part of the unit, and will dissipate heat to the bearing carrying member.

. . . Small Parts Inspection

FIG. 1—Table type of Limitron installation equipped with a turntable for maximum production and provided with an audible signaling device for use by a blind operator.

Designed to make possible the automatic gaging and classifying of small parts on a high production basis, a new type of gaging system, known as Limitron, is described herein. This instrument features multipurpose application, complete automaticity and the suitability for use by blind, partially deaf or otherwise disabled personnel, without preliminary training.

By C. W. WARREN
Consulting Engineer,
Arma Corp., Brooklyn

PRODUCTION gaging of relatively complicated parts by use of automatic, multiple-point air or electrically operated gages is already established as a standard technique and is steadily gaining in favor. Many manufacturers, however, appear to have overlooked the tremendous economies that can be effected by applying automatic gaging to simple go and no go operations on small parts. Such parts are most commonly checked by means of an ordinary snap gage, either held by hand or attached to the bench by a small fixture. At best, they are passed under some type of comparator and sorted by hand into appropriate containers for good, under and oversize parts. Both the snap and comparator types of gage, however, require the services of a fairly skilled operator who can be trusted to put the right part in the right box every time.

Of particular interest, therefore, is a new type of automatic gage recently introduced by Arma Corp., Brooklyn, which can be operated by completely unskilled personnel, and which automatically sorts the parts into their proper classifications without the possibility of human error. Engaged exclusively since 1918 in the manufacture of fire control and range finding equipment for the U. S. Navy, Arma Corp. is making its first venture into the commercial field with this Limitron inspection system.

The instrument consists of a gaging head mounted on a stand and capable of adjustment up to a maximum height of 1½ in. Investigations have shown that 95 pct of all screw machine products are under 1½ in. in maximum dimension, and it is to such parts that the instrument finds its widest application. The stand carries the lower anvil, or work table, and a wide variety of work holding fixtures may be applied to this. A common type of fixture consists of a swinging arm having a hole in which the part can be nested. A workpiece is placed in the hole with the lower end resting on the work table, and the arm is swung to carry the part under the gaging head. After passing the head the arm passes over an opening in the base of the stand, permitting the workpiece to fall through the hole and into the automatic sorting unit. For very small pieces this is preferable to holding the parts in the fingers, since it prevents interference with the gage head and insures that the parts are held vertical. For very high production a power operated turntable is available. Into this a variety of differently shaped nesting blocks can be fitted, and all that is required of the operator is to keep the nests loaded. This type of fixture is illustrated in fig. 1, and it is possible to handle 3000 to 5000 pieces per hour with manual feeds, and up to 7000 pieces per hour when suitable hopper feeds are added to the equipment.

The gaging head is adjusted to the high and low limits of the part by means of locked and concealed

by Automatic Gaging

micrometer screws out of reach of the operator, making the instrument virtually foolproof. The maximum adjustment between high and low is 0.030 in. and the normal minimum is 0.0001 in. Under very carefully controlled conditions it would be possible to reduce this minimum adjustment to millionths, but this is not considered practical for production work. Setting is by means of gage blocks or master sized duplicates of the workpiece to be gaged.

Attached to the head by a cable, but otherwise a separate unit, is a control box containing the necessary electronic tubes and signal lights. There is thus no danger of the heat of the tubes causing any errors of reading, and the circuit is so designed that no warm-up period is necessary. The sensitive mechanism in the head handles only a few milliwatts of power, so there is no danger of burning, pitting, or changes of setting resulting from current flow in the gaging elements.

The third essential part of the unit is the sorter containing three chutes with mechanically operated gates. The reject, or undersize, gate is normally open so that in the event of a power failure, or of parts being accidentally dropped into the chute without passing under the gaging head, these will automatically fall into the reject pan. When a part lying within the present limits is passed under the head, a green light is lit on the control unit, and at the same time an impulse from an electronic tube closes the reject gate and opens the gate to the accepted parts chute. If the part is oversize, a red light is lit and the piece passes through a different chute into an appropriate pan, while if the part is undersize, and thus incapable of salvage, a yellow light is lit and the part passed into a reject pan.

Classification is completely automatic, and the lights serve merely to give the operator an indication of the way the parts are running, and to permit him, if necessary, to warn the production department that there is a definite trend to over or undersize parts. There is also a certain psychological effect that conveys to the operator the feeling that something is going on, and that he is not merely feeding parts into a hole. If desired, the machine can be fitted with earphones for the use of blind operators, and in this case a medium tone indicates a passable part, a high tone shows an oversize part and a low tone an undersize part. Bone conduction phones may also be used for the benefit of the hard of hearing.

As an accessory, a fourth unit can also be plugged into the system to provide a count of the pieces handled. This is usually furnished with two counters, the one with red figures indicating the number of oversize rejections, and the other showing the total number of accepted parts. Adding the two figures together, plus a count of the undersize pieces, gives a count of the total pieces handled during a given period. Knowing the speed of the turntable makes it possible to check on the efficiency of the operator. Counter units are locked in and can be reset to zero only with the proper key.

The system can be supplied as a bench model in which the gaging head is mounted directly on top of the classifier and the control unit stood to one side on the bench. This is illustrated in fig. 2, which also shows the use of simple trays to collect the bad parts to right and left and the good parts at the rear. A small fan is built into the classifier to dissipate any slight amount of heat generated by the operation of the classifier gate mechanism. More complete, however, is the table model consisting of a smooth top table carrying the gaging head and control box, and with the classifier mounted underneath. Beneath this are mounted the tote pans for the different size parts.

FIG. 2—Bench model setup with the gaging head mounted directly on top of the classifier, and shallow trays used for collecting the accepted and rejected parts. A swinging arm type of workholder is used.

Quite apart from its accuracy and speed of operation, the outstanding feature of this gage is its universality. It is not necessary to have a separate gage for each different part since the one instrument can be reset to gage all types of parts in a few minutes. For special operations, heads can be set in a horizontal position and gaging can be performed right at the machine. Piston rings, for example, can be discharged from the grinder on edge and automatically gaged for thickness as they roll down a chute from the machine. Deep drawn parts such as cartridge cases and similar items can be gaged for depth by use of a special upper anvil attached to a horizontal head. In this case the parts are pulled off the unit and dropped down an opening leading to the classifier.

For larger parts, up to 5 in. in height, the instrument may be used as a comparator, in which case the signal lights or tones serve to indicate the condition of the part, but the classifier cannot be used.

Industrial Finishing Exhibition Set for Detroit, June 23-27

Latest developments in industrial finishing methods to be featured at the Detroit exposition held in conjunction with the annual meeting of the American Electroplaters' Society. Extensive technical and plant visitation program announced by society.

FEATURING for the first time in 11 years an extensive exhibition of equipment and supplies, the annual convention of the American Electroplaters' Society which will be held in Detroit, June 23 to 27, is expected to set new highs in both attendance and technical interest. Under the chairmanship of G. L. Nankervis, the convention committee has scheduled an extensive program of technical meetings and social activities, in addition to the equipment exposition. The technical sessions will be held at the Hotel Statler.

The exposition, which will be housed at the Detroit Convention Hall, will feature the products of more than 100 exhibitors and will cover latest developments in metal finishing and plating equipment, processes, materials, services and plated products. One of the highlights of the exhibition will be an operating exhibit of a completely equipped plating installation. Another exhibit that promises to attract unusual interest will be a display covering generator control for current reversal.

The annual banquet will be held at the Hotel Statler on Thursday, at which time the society's various awards will be distributed. The convention committee has also arranged a large number of plant tours which will give convention visitors an opportunity to see all types and sizes of automotive finishing installations.

The convention committee is headed by G. L. Nankervis, president, George L. Nankervis Co., Detroit. The Detroit chapter of AES, headed by W. W. Wilson, Vickers, Inc., is acting as host to the convention.

Condensed A. E. S. Technical Program

Monday, June 23

2:00 to 4:30 P. M.—First Educational Session—

(1) *Stress in Electrodeposits and Its Significance*—K. G. Soderberg and A. K. Graham, Graham, Crowley & Associates, Inc.

(2) *Stress in Electrodeposited Nickel*—William Phillips and F. L. Clifton, General Motors Research Div.

(3) *Physical Properties of Electrodeposited Chromium*—Abner Brenner, Polly Burkhead and Charles W. Jennings, National Bureau of Standards.

(4) *Bright Brass Plating of Zinc Base Diecastings*—Stanley J. Beyer, Hart Mfg. Co.

Tuesday, June 24

9:00 to 11:30 A. M.—Second Educational Session—

(1) *Modern Applications of Electroplating Solution Purification*—B. C. Case, Hanson-Van Winkle-Munning Co.

(2) *Electroforming Pilot Static Tubes*—Alfred S. Kasdan, Kollsman Instrument Div., Square D Co.

(3) *Chemical Deposition of Nickel and Cobalt*—Abner Brenner and Grace Riddell, National Bureau of Standards.

(4) *Recent Developments in the Use of Conversion Coatings on Zinc*—J. E. Starek and W. S. Cibulskis, United Chromium, Inc.

(5) *Bulk Nickel Plating* — Henry Strow, Mac-Dermid, Inc.

Wednesday, June 25

9:30 to 12:00 Noon—Third Educational Session—

(1) *Manufacturing Process for Standard 60-in. Reflector*, A Sound Film in Color—Engineer Board, Fort Belvoir, Va.

(2) *Barrel Chromium Plating*—G. Dubpernell and S. M. Martin, United Chromium, Inc.

(3) *An Industrial Hygienist on Chromium Plating*—J. E. Molas, City of St. Louis.

(4) *Standardization of Buffing for Preparation of Atmospheric Exposure Test Panels*—C. C. Cupps. Standard Steel Spring Co., and A. K. Graham, Graham, Crowley & Associates, Inc.

(5) *Evaluation of Buffability of Nickel Deposits*—R. D. Miller, Bumper Div., Electric Auto-Lite Co., and A. H. Du Rose, Harshaw Chemical Co.

2:30 to 5:00 P. M.—Fourth Educational Session—

Reports on AES Research Committee activities.

Project No. 2—*Extraction Methods Applied to Electroplating Baths—Determination of Zinc and Other Impurities in Nickel Plating Solutions*—E. J. Serfass, Lehigh University.

Project No. 4—*Effect of Surface Finish of Nonferrous Base Metals on Protective Value of Plated Coatings*—George I. Kahn, U. S. Time Corp.

Project No. 5—*Some Effects of Copper in Nickel Plating Solutions*—D. T. Ewings, Michigan State College.

Project No. 6—*Protective Power of Electrodeposits*—N. Thon, Princeton University.

Thursday, June 26

9:30 A. M. to 12:00 Noon—Fifth Educational Session—

LEFT

G. L. NANKERVIS, general chairman of the Industrial Finishing Convention. Mr. Nankervis is president of the George L. Nankervis Co., Detroit.

o o o

RIGHT

F. K. SAVAGE, Kuehne Mfg. Co., Mattoon, Ill., and president American Electroplaters' Society.

Project No. 7—*Evaluation of Methods for Determining the Thickness of Electrodeposited Coatings*—Harold J. Reed, Pennsylvania State College.

Project No. 8—*General Considerations of Experimental Methods for Determining Polarization*—Alfred L. Ferguson, University of Michigan.

Project No. 9—*Physical Properties of Electrodeposited Metal*—Abner Brenner, National Bureau of Standards.

Project No. 10—*Present Status of Plating Room Waste Disposal*—B. F. Dodge and D. C. Reams, Yale University.

Exhibitors at Industrial Finishing Exposition

Acme Mfg. Co.
Advance Plating Co., Inc.
Advance Polishing Wheels, Inc.
Aget-Detroit Co.
Alsop Engineering Corp.
Aluminum Co. of America
American Buff Co.
American Electroplaters' Society Committee.
American Instrument Co.
American Rolling Mill Co.
Auto City Plating Co.
Automotive Rubber Co., Inc.

Bart-Messing Corp.
Barwin Co.
Beacon Wiper Supply Co.
Behr-Manning Corp.
Belke Mfg. Co.
G. S. Blakeslee & Co.
Bruce Products Corp.
Buckeye Products Co.
Buckingham Products Co.
Bullard Co.
A. S. Campbell Co., Inc.
Chemical Corp.
F. L. & J. C. Codman Co.
Commercial Filters Corp.
Crown Rheostat & Supply Co.

Darco Corp.
Detrex Corp.
Detroit Chapter American Elec. Platers Society
Detroit Chemical Specialties Co.
Detroit Plating Industries
Die Castings (Technical Publishing Co.)
Diversey Corp.
Division Lead Co.
Douglas & Lomason Co.
Dunn Products.
E. I. du Pont de Nemours & Co.
Durion Co., Inc

Eaton-Clark Co.
Egyptian Lacquer Mfg. Co.
Electric Products Co.
Electro-Tech Equipment Co.

Federal Telephone & Radio Corp.
Formax Mfg. Co.
Fulton Sylphon Co.

Gate City Plating Works.
General Chemical Co.
General Elec. Co.
Gerity - Michigan Die Casting Co.
W. Green Electric Co., Inc.

Frederick Gumm Chemical Co., Inc.
Hammond Machinery Builders, Inc.
Hanson-Van Winkle-Munning Co.
Harding Mfg. Co., Inc.
Harshaw Chemical Co.
Haveg Corp.
Heil Process Equipment Corp.
Houdaille-Hershey Corp.

M. P. Iding Disc Grinding Compound Co., Inc.
Industrial Electroplating Co. (Niehaus Engineering Co.)
Industrial Filter & Pump Mfg. Co.
International Nickel Co., Inc.
Ion Industries, Inc.
THE IRON AGE.

Knight Plating Co.

Lasalco Inc.
Lea Mfg. Co.
Charles F. L'Hommedieu Co.

Maas & Waldstein Co.
MacDermid, Inc.
R. C. Mahoney.
Mall Tool Co.
Manderscheid Co.
Manufacturers Processing Co.
McGean Chemical Co.
Meaker Co.
Metal Finishing, (Metal Industry Publishing Co.)
Michigan Abrasive Co.
Michigan Chrome & Chemical Co.
J. C. Miller Co.
Milwaukee Motive Mfg. Co.
Modern Hard Chrome Service Co.
Murray-Way Corp.

George L. Nankervis Co.
Nelson Chemical Corp., (Gripmaster Div.).
Oakite Products, Inc.

Parker Rust Proof Co.
Plating Institute.
Products Finishing.
Promat Div. Poor & Co.

James H. Rhodes & Co.
Richardson-Allen Corp.

Claude B. Schneible Co.
Wm. R. Shields Co.
J. J. Siefen Co.
Solventol Chemical Products, Inc.
Sparkler Mfg. Co.
Special Chemical Corp.
Standard Electrical Tool Co.
Standard Plating Rack Co.
Frederic B. Stevens, Inc.
Sturgis Products Co.
Sulphur Products Co., Inc.

Tex-Rite Products Co.
H. O. Trerice Co.
Udylite Corp.
United Chromium, Inc.
United Platers, Inc.
U. S. Stoneware Co.
Wagner Bros., Inc.
A. T. Wagner Co.
Waverly Petroleum Products Co.
Wico Metal Products Co.
Wyandotte Chemicals Corp.
Wyandotte Paint Products Co.

Zapon Div., Atlas Powder Co.

. . . Automatic

By ADOLPH BREGMAN
Consulting Engineer
New York

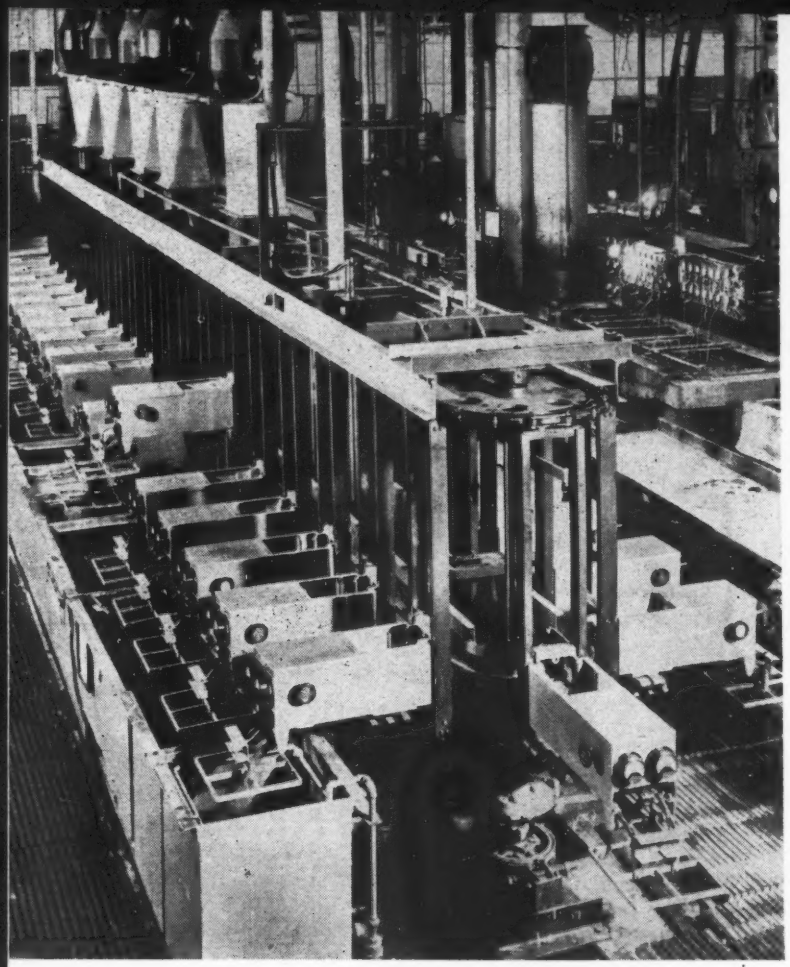


FIG. 1—View of Hanson-Van Winkle-Munning full automatic conveyer of the elevator type, showing carriers with control panels. Note overhead fans coming through the center. Loading and unloading stations are in the foreground.

THE advent of labor saving devices has usually evoked mixed feelings of admiration and resentment in the worker, who felt that the machine was competing for his job. The first plating conveyer doubtless produced the same reaction among the plating fraternity. For example, back at the turn of the century, one of the pioneers in the design and construction of automatic plating machines, Charles J. Caley,[1] general manager of Russell & Erwin Mfg Co., New Britain, Conn. found his efforts greeted with criticism and ridicule. Nevertheless, he continued his work and by his perseverance and courage, brought it to a successful conclusion. His machine, which was operated by boys, plated 2450 steel door knobs per hour, whereas formerly, a force of several men had been employed to plate 2000 knobs by hand in a day. The plating of door locks was also stepped up by this machine from a former day's output of 1500 to a rate of 1800 per hr.

The most prominent figure associated with the early development of the plating conveyer appears to have been David F. Broderick, who designed and patented a continuous overhead full automatic chain conveyer for carrying parts through the succession of baths and treatments required to turn out a plated product.[2] The exclusive right to manufacture and sell conveyers made under these patents was acquired by A. P. Munning & Co., Matawan, N. J., in 1916.

The function of the automatic plating machine or plating conveyer is to receive parts of bare metal and to deliver a plated product The operations involved normally include cleaning, pickling, electroplating, rinsing and drying, although other operations such as acid dipping, oxidizing, bonderizing, anodizing, etc., are often performed. Plating conveyers or full automatics are characterized by being continuous in operation which distinguishes them from other plating machines such as plating barrels, which are generally designed for noncontinuous or batch operations.

The obvious field of application for automatic plating equipment is in the plant which handles a large volume of work of similar size, shape and finish. The accepted practice today is to install full automatics whenever production requirements rise to the point where such machines become economical. On the other hand, it is far from advisable to replace all hand plating. Full automatics are best suited for continuous production of the same type or class of work, and not for a varied assortment of work such as normally comes into job shops. Nevertheless, several of the largest job shop platers have installed plating conveyers and have found them well suited to their requirements.

The prospective purchaser of a plating conveyer in

[1] *Anon. "Novel Automatic Plating Machine," Metal Industry, 8,* (1910).
[2] *Anon. "History of the Full Automatic Conveying Machine for Plating," Metal Industry, 24,* (1926).

Conveyers for Electroplating

Electroplating as an industrial process began to "grow up" with the advent of the plating conveyer. It even seems probable that in many instances electroplated products have been able to survive in competition with new alloys, or with other methods of finishing, only by reason of the development of large scale plating operations at low cost. An extensive discussion of the design, selection and operating characteristics of full automatic conveyers, for electroplating equipment is presented in this article. In this, the first part of a two-part article, the author discusses the development of automatic units, describes the major types of machines available and tells where each type may be most effectively used.

considering the varied makes and types of machines must keep in mind constantly one most important requirement, namely that the machine must be suited to his product and his plant conditions. Even though the product may be similar to or even the same as a competitors, his plant conditions, floor space, head room and layout will be different. Consequently, in almost all cases, a full automatic plating machine must be designed for the particular job and location. There is no one best standard, ready-made machine; each machine must be tailor-made to fit the user's needs.

In general, however, there are certain ideal specifications against which all such machines are measured. These are:

Ample capacity
Rugged construction; long life.
Minimum floor space.
Minimum head room.
Simplicity of mechanisms.
Accessibility of all mechanisms and work in process.
Adaptability to different types of work; ease of revamping for conversion from one type of work to another.
Low cost of assembly and installation.
Low cost of operation—labor, power, maintenance, etc.

Where floor space is a major consideration, it must be borne in mind that setting the drive mechanism on the floor instead of overhead results in greater floor space requirements. In a word, any machinery requires space, on the floor or overhead, and the place to put it will be determined by the local conditions.

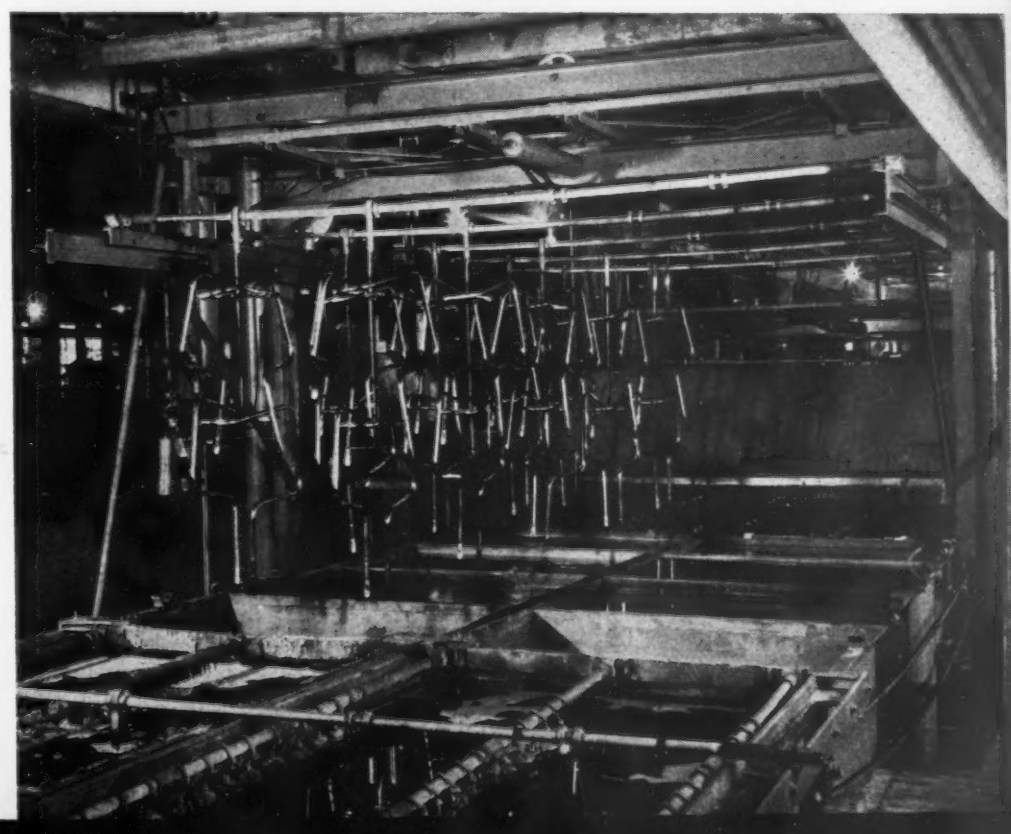
As stated above, there is no one machine or even type of machine that embodies all of these advantages. The machine chosen must be the one that approximates them most closely under the existing conditions.

Full automatic plating machines are composed of certain basic elements common to all types and designs, briefly as follows:

(1) Framework or support.
(2) Tanks for cleaning, pickling, rinsing and plating.
(3) Anode bus bars to carry the current from the generator to the anodes.
(4) Cathode rails to carry the current from the work back to the generator.
(5) Drive mechanism to move the conveyer chain.
(6) Conveyer chain to move the work carriers.
(7) Carrier mechanism to hold the work racks.
(8) Transfer mechanism to provide means of lifting racks out of one tank and transferring them to another.
(9) Driers.

The primary consideration in the framework is strength and sturdiness. At one time riveting was

FIG. 2—Crown Unit-Matic with four lanes of work, tubular metal furniture, being cleaned, bright nickel plated, rinsed, and neutralized and then chromium plated. This machine is the straight-a-way type.



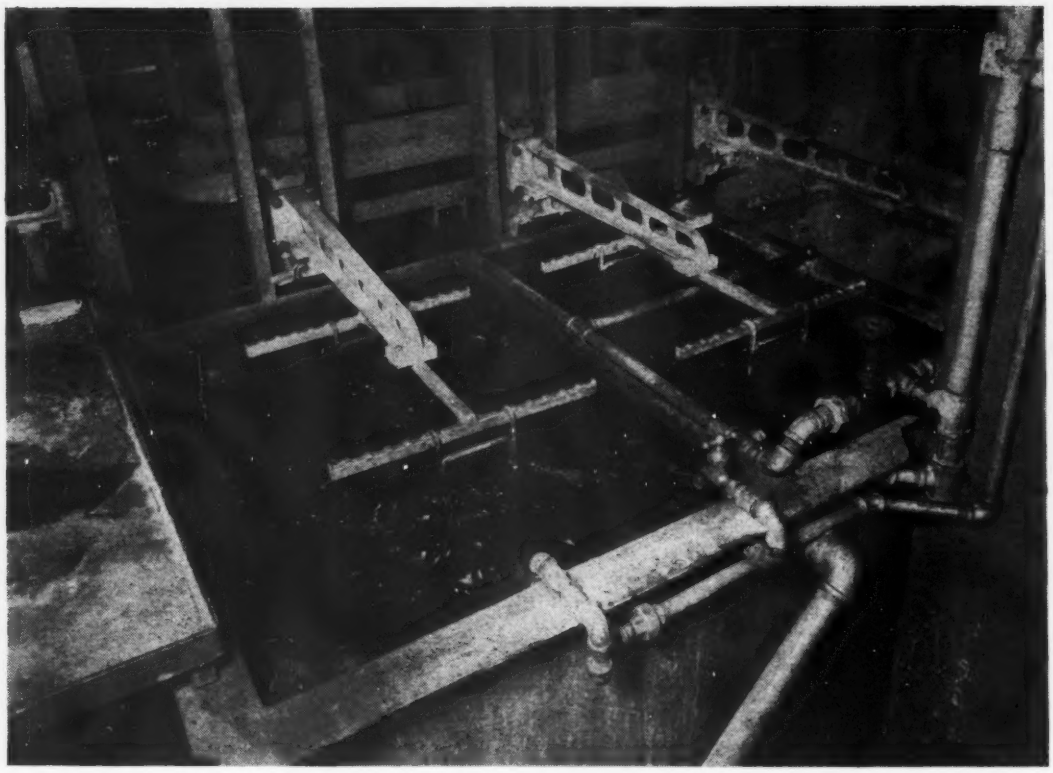


FIG. 3—Closeup of two dip tanks of a H-VW-M full automatic conveyer, elevator type. Note detail of elevator mechanism and of elevator track supporting the roller skate of carriers.

most common, but today welded construction has almost completely replaced it. An important consideration also is that it take up a minimum of headroom. The framework varies with the local conditions to be met. In some instances it carries the operating mechanism which increases the total height of the structure. In others, the drives and other mechanical features are set on the floor in the center or at the side of the conveyer loop.

As in all plating installations, the tanks may be constructed of wood, welded steel, or stoneware. If of wood, cypress or fir are most commonly employed, and these tanks may be lined with asphaltum or lead. Today, however, the tanks are almost always of steel, lined with rubber, lead, brick, glass, or other special acid-proof compositions. The size of the tanks used in some installations is impressive. In one plant a 33,000-gal tank contains the bright nickel plating solution in which radiator grilles for passenger cars are plated.[3]

Heating or cooling coils, as a rule, are mounted on the sides of the tanks, between the tank wall and the anodes.

Anode bus bars are of copper, of sufficient cross-section to carry the necessary current for the work going through the machine. In general, all bus bars and other electrical leader lines should be kept to minimum length consistent with the plant layout in order to keep the voltage drop along these lines to a minimum.

Cathode rails carrying the current from the work back to the generator, are also of copper and must be insulated from tanks and framework. They must also be of sufficient size to take care of full current requirements. They have the additional requirement of providing positive contacts, sliding or rolling as the case may be, as the work moves through the complete cycle. In the design and construction, and also in the operation of plating conveyers, these contacts must be carefully watched in order to permit full and continuous flow of the current. Anodes are commonly of oval cross-section, but sometimes flat, and often in the form of balls, held in special wire baskets.

A high degree of uniformity of deposit can be obtained by importing cathode agitation in addition to the normal forward movement of the work, in the form of several additional motions to the work. These motions include: (1) Continuous or intermittent rotation from the suspension point of carriers; (2) horizontal oscillations; (3) vertical or composite motions, for very accurate deposit distribution. For example, in one machine, three forms of agitation are combined: (1) The forward movement due to the conveyer chain; (2) a reciprocating motion, parallel to the chain travel; (3) a transverse reciprocating motion. There are independent controls for each of these motions, which may be operated together or independently. Another advantage of agitation is that higher current densities may be used to increase the speed of deposit.

One of the key points in the full automatic plating conveyer is the transfer mechanism, the device for moving the work from one tank to another. In plating, as in no other process, this move is of primary importance. In the first place, the work must not be allowed to dry between tanks, or oxidation, rust, etc., may set in. Moreover, time spent between treatment tanks is time lost for practical purposes and shows up in the total daily output.

However, there are certain limitations peculiar to this type of processing. Dragout from every tank (except rinses) must be kept at a minimum to conserve chemicals. The work must be allowed to drain thoroughly after each treatment, and, of course, drippage must be caught by aprons and returned to the tank from which it emanated.

[3] *A. G. Spencer. "Automatic Bright Nickel Plating of Automobile Radiator Grills," Metal Industry, 38, pp. 197-200 (1940).*

Under these circumstances it is clear that in many cases the rate of speed at which the work moves during the transfers must be higher than during the treatment times. In order to effect this irregular forward motion, the transfer may be handled by an independent mechanism, specially timed for the particular job and the drive must be independent of the main chain drive. Also the transfer drive may be variable in order to allow for changes in the timing schedule as different types of work are put through the conveyer. However, some machines use only a single drive for both forward chain and transfer. Various types of transfer mechanisms are described later in this article.

The carriers are another important element in plating machines. They must be strong enough to hold substantial loads, and at the same time as light as possible in order to reduce dead weight and keep the power requirements to a minimum.

Types of Plating Machines

There are two general classifications of plating machines: Semiautomatic and full automatic. In semiautomatic equipment the work is handled mechanically only after it has been manually placed in the plating bath. Other operations, such as cleaning, pickling, rinsing and drying, are handled independently of the electroplating tank. The automatic feature in the semiautomatic machine is the definite time schedule for the plating operation as the work is moved through the plating tank on which the conveying mechanism is mounted.

In full automatic plating the only manual operations required are placing the work on racks, loading the racks on the machine and removing the finished and dried work from the machine. The conveyer carries the work according to a fixed time schedule through all the cleaning, pickling, plating rinsing and drying operations.

Full automatic machines are divided into the following general types: (1) Straight-line machines in which the work is loaded at one end and unloaded at the other (see figs. 2 and 4), and (2) return-type machines in which the work describes a complete circuit, returning to the loading and unloading points which are located adjacent to each other at either end or at the side of the machine (see fig. 6).

These two main types are again subdivided, according to the mechanism, into continuous progress and dwell type machines. In the continuous progress machine, the work is kept constantly moving forward from the loading to the unloading station. In the dwell type conveyer, the work remains stationary for one or more periods of time, of the length desired, in each of the various baths.

Within these broader classifications are numerous variations based upon the mechanical design, to meet the specific requirements for the work to be plated, and the floor space and headroom available for the installation.

These variations, based upon mechanical design, include: The elevator type (see figs. 1 and 3); the umbrella, in which the treatment tanks are set in a circle; side arm carriers; angle carriers (see fig. 5); the lift directly over the tank; arm transfers; chainloop transfers; roller coaster or hump type transfers, etc. Refinements include special timing mechanisms and controls, mechanisms for rotating the work in the baths, vertical oscillation of work, air agitation, temperature control, etc. The factors that determine the kind of equipment to use include size, shape, type, and quantity of work to be plated; metal to be deposited; length and width of racks on which the work is hung; time of immersion; time of transfer between baths.

In all conveyers, the work moves steadily from the loading to the unloading stations. An important point of differentiation, however, is that the type of movement may be intermittent or continuous. In the straight line and also in many return-type conveyers, the movement is continuous, the work maintaining its forward motion as it goes through the treatment tanks. In the elevator type and the umbrella type the forward movement is intermittent; that is, the work dwells for a period in each tank and forward motion takes place only during transfers.

It will be seen of course that the dwell type is theoretically at a disadvantage in that it does not induce continuous agitation of the solution by its motion as is the case with the continuous motion conveyer. It

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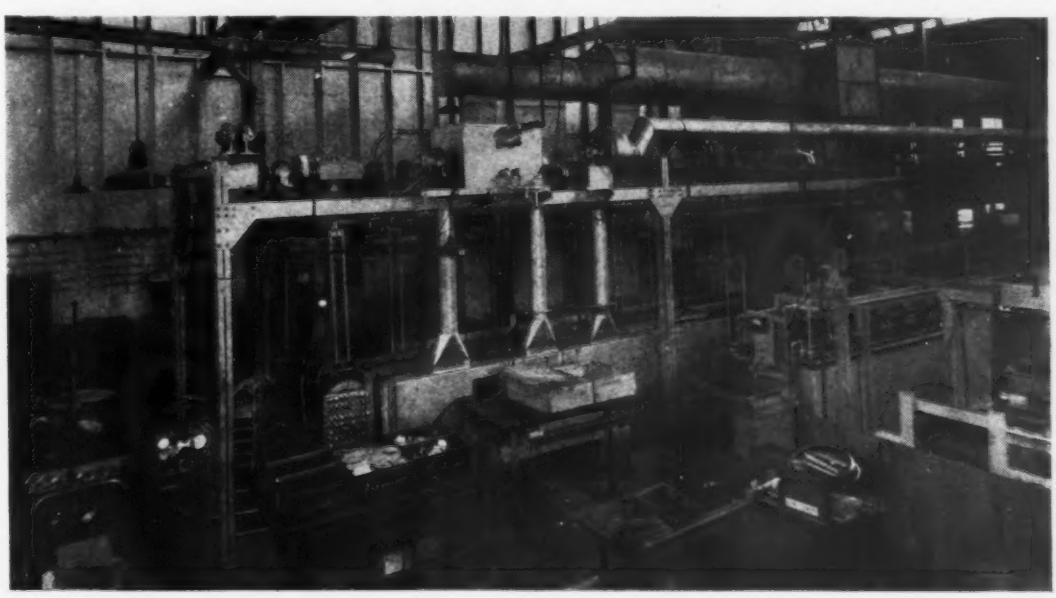

FIG. 4—Full automatic conveyer Munning type, used in conjunction with the H-VW-M heavy-duty semiautomatic. Hot and cold blast type dryers are shown just ahead of the unloading station.

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does, however, cause some agitation when intermittently moved forward. Also, it is possible to set up rotating or vertical agitation, or both, as desired.

The Straight-Line Machine

Straight-line machines are best suited for mass-handling work that is bulky or heavy, where current requirements are extremely high, and where straight-line operation fits into the general flow of work in the plant. The loading station is situated at one end, the unloading station at the other, so that the work advances in a straight line from one point to another. The work is suspended from horizontal carrier rods, each holding a number of racks. The rods are moved by two synchronized main conveying chains, each engaging one end of the carrier rods. As a set of racks approaches the end of a tank, the ends of the carrier rod meet an extension cup or a knob on the chain of the transfer mechanism (one on each side of the machine operating in a vertical plane independently of the main conveying chains, but synchronized with them) which carry the rod with its load of racks upward out of that tank, and advance it toward and then lower it into the next tank. The work, therefore, moves steadily forward through the whole series of tanks. At the end of the last tank, the work is removed by hand and the carrier rods returned overhead to the starting point either on the main conveyer chains or, in some instances, by a pair of fast moving auxiliary chains which permit reducing the total number of carriers required by placing the carriers farther apart on these fast moving chains. Both the conveyer and the transfer chains operate continuously at predetermined speeds and all chains are perfectly synchronized. Since the transfer chains operate independently of the conveyer chains, it is possible to provide fast transfers and slow transfers, wide transfers and narrow transfers, as desired, all perfectly synchronized.

The principal features of the straight-line conveyer are:

(1) It can handle abnormally large work such as assembled airplane wings requiring unusually high lifts, bumper bars, conduit pipe (horizontal or vertical), etc.

(2) Work can be loaded at one end and unloaded at the opposite end, or returned overhead.

(3) It is applicable to precleaning, drying and prime coat dips on large massive stampings such as airplane cowling, which are later given a paint finish, etc.

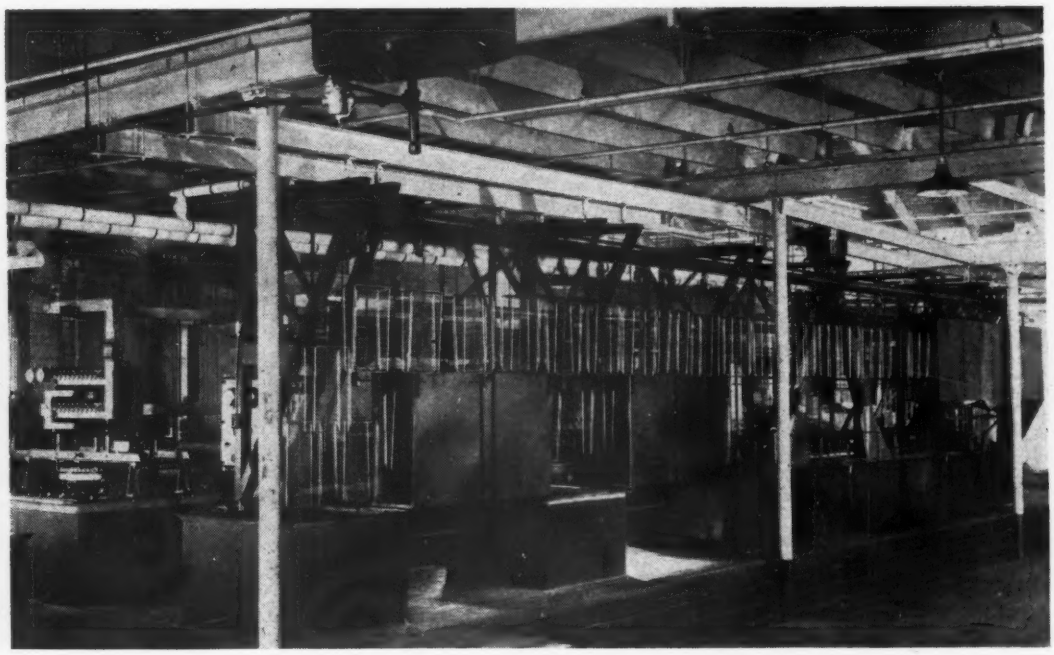

FIG. 5 — Overall view of a 30° angle type Lasalco full automatic conveyer.

(4) For bath tubs, refrigerator liners, sinks, etc., that require cleaning, pickling and prime coats prior to vitreous enamel, this type of machine has been found highly adaptable.

Return-Type Machine

In the return-type, a full circuit is made, the completed work being returned to the starting point, both the loading and unloading being done at the same or adjacent points, either at the end or along one side of the unit, as desired. In general, such machines are more compact than the straight line, taking up less floor space.

One example of a return-type unit consists of two parallel rows of tanks set under the conveyer mechanism which rests on a supporting framework with a single conveyer chain. The work carriers are vertical, moved by pusher pins, spaced at intervals on the conveyer chain. The rack carrying the work is moved along until it meets a transfer loop which carries the rack first upward and forward, and then downward into the next tank. In this machine, the transfer loops may operate independently of the main conveyer chain, but synchronized with it. On the other hand, a single driving unit, through proper gear reducers and gear trains, may operate both the transfer loops and the main conveyer chain and keep them synchronized.

The principal features of return-type machines are:

(1) Continuous movement of work in all treatments.
(2) Rapid transfer from one treatment tank to another.
(3) Selective treatment times, varied for each individual treatment tank.
(4) High speed horizontal agitation in the plating baths.

Present installations of return-type conveyers range in size from 25 to 175 ft in length, and include as many as 30 treatment operations.

An important feature of this machine is its adaptability for work in conjunction with semiautomatic plating machines, performing all pretreatments in the full automatic, and also the final treatments, including drying, while the plating operations are carried on in accessory semiautomatic machines. Such combinations permit selective deposits of different metals without segregation of production loads, and also other combinations where several thicknesses of deposit are involved.

and lowered in a vertical plane. Two conveyer chains, one at the top and the other at the bottom, move the carriers and the guides forward to positions over the various tanks in order, and the work is thus advanced from one tank to the next. The elevator, which lifts the work out of one tank and lowers it into the next, is counterbalanced, moving up and down within a fixed distance.

The elevator machine may be operated hydraulically throughout. It may also use a geared motor to drive the conveyer chains which advance the carriers and a hydraulic mechanism for the elevator; or mechanically throughout, as desired. Under any type of drive, both forward and elevating motions are synchronized.

Where agitation of solutions is desired, it may be provided by a short up-and-down motion of the elevator or rotation of the baskets or barrels on the carrier arms; or the forward drive chain may be moved forward and backward within a short distance. The time

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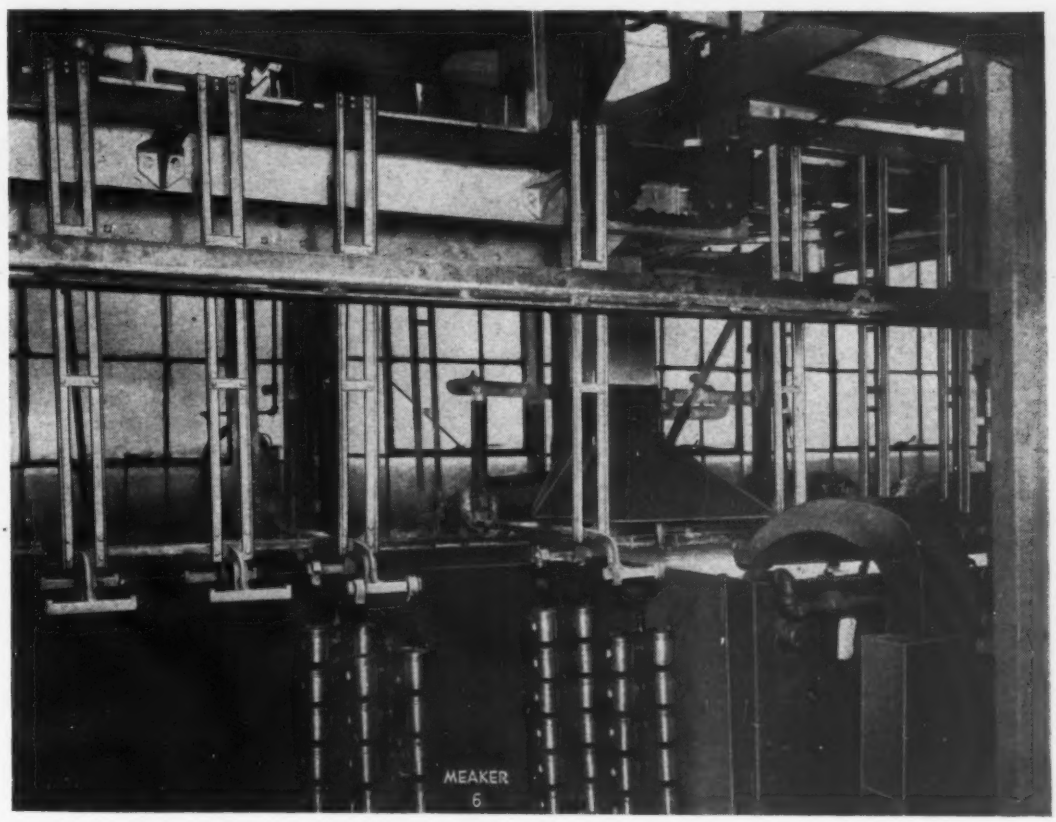

FIG. 6 — Loading and unloading station of a Meaker return-type machine used for tinplating cast iron pistons.

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The elevator-type is also used for medium to heavy-duty work. All submersions are made for a definite predetermined length of time. However, instead of having the conveying equipment over the series of tanks, the operating mechanism is located in the center of an elongated oval or loop of tanks. The carrier arms, extending from this central mechanism, carry the racks holding the parts to be treated, or they may be in baskets or even in barrels, if large numbers of small parts are to be processed. The horizontal carrier arms are mounted on rollers operating in vertical guide channels. They do not swing or rotate, but remain horizontal, at right angles to the line of travel, and are raised

of dwell in each treatment tank may be regulated at will and a fixed transfer time maintained.

If a particular operation requires a shorter treatment time than the rest time, a delayed set-down mechanism may be employed, which holds the work above the solution for any given length of time, thus adjusting treatment time to any length within the rest period.

This type of conveyer may also include other features to suit the special conditions of the user, such as bipolar arms, electrical control of plating time to vary it without varying the transfer time, loading from either end or at points between the ends, etc. In this conveyer, as in the side-arm conveyer, discussed later

in this article, there is no interference from overhead construction, bus bars, steam and water lines, etc. A more detailed description of the elevator-type conveyer will be given later in this article.

Side-Arm Type Machine

Another full automatic return-type plating machine is the side-arm type. This machine can be built with either intermittent or continuous forward movement. The operating mechanism is located on the floor between parallel rows of tanks. The carrier arms are mounted on pivots in chain brackets from the main chain and the plating racks are hung on the carriers. The conveyer chain speed regulates the transfer time from one tank to another.

In the continuous movement side-arm machine, the transfer may be made from one tank to another by means of a cam on which the rollers on the carrier arm ride upward and over, and then down toward the next tank. Because of the chain movement, the processing tanks are longer than the tanks used for the same purpose in the intermittent movement machine. Using another mechanism, the carrier arms may be raised and lowered by means of a transfer lever. When the arm reaches its highest position, the work is carried over the tank and the next transfer lever lowers it into the next tank.

In the intermittent movement machine, the work is transferred from one tank to another by the hump type transfer or by an auxiliary cam, synchronized with the main chain. The work may remain stationary in the tank or it may be moved through the tank by successive steps, depending upon the transfer periods set for the machine. The predetermined transfer time remains constant, but the rest period may be varied.

Because the work enters the tanks vertically, the auxiliary cam type of transfer calls for minimum tank lengths, and consequently, minimum overall length of the whole plating machine. Agitation of the solution can be obtained by mechanisms which activate the carrier arm at any desired rate. Delayed set-downs are available in this machine as they are in the elevator type. Another side-arm machine effects the transfer by means of a curved load-carrying track or cam.

In a modified side-arm machine, the rack is swung from one tank to another, from the vertical to the horizontal position. This device is recommended for cup-shaped pieces for when the racks are raised to the horizontal position, the solution in the cups is drained off, eliminating much of the dragout. Also, this machine requires less headroom; the sidewise transfer calls for less overhead room than the vertical transfer. The work may be agitated sidewise in the solution as well as forward. End sway is greatly reduced by the short length of the racks, and the tanks may be set close together. Automatic unloading is also practical, and racks can be switched while the machine is in motion.

Angle-Type Machine

The angle-type machine was designed especially for chromium plating. The carriers are set at a 30° angle to the vertical to permit the use of thick racks and close spacing. As a rack travels up the 30° incline, it also moves outward so that the following racks may close in underneath or in back, thus telescoping as they move, and keeping close together with no interference.

Small Parts Machine

One type of side-arm machine is widely used for cleaning and electroplating small parts such as bolts, nuts and small stampings. This machine carries baskets or barrels of perforated sheet steel coated with rubber, on bronze supporting arms attached to the conveying chain and extending downward at an angle of 45°. Rollers on the arms meet hump-type cams on the frame of the machine which lift the baskets from one tank to lower them into the next. Two separate drives are used: One for the chain which moves the arms carrying the baskets through the various stages of immersion, and the other for revolving the baskets.

Umbrella-Type Machine

The umbrella or rotary-type full automatic conveyer is one in which the driving mechanism is in the center of a circle with the treatment tanks set tangentially or radially about the periphery. A revolving framework holding the work carriers is supported independently of the tanks by a center column and the work on racks or wires is hung on the framework. The circular and up-and-down motions may be effected mechanically or hydraulically. Controls may be fully automatic, and timing of tank dwells and transfers varied to suit requirements.

This type of machine is suited for high lifts as the operating mechanism is at floor level, and also to fit into special floor space and layout conditions. It has been used for a variety of operations, including descaling, cleaning, electroplating and dipping, anodizing, chromate treatment of zinc, etc.

The second part of this two-part article, in which the author discusses plating costs, advantages of automatics, and gives descriptions of equipment available for automatic and semi-automatic plating, will appear in the following issue.—Ed.

. . . NEW BOOKS . . .

"The Welding Encyclopedia," by T. B. Jefferson. The twelfth edition presents an up-to-date treatment of every subject which deals with welding, cutting or related processes. In this edition, 300 pages of material of the previous edition were replaced to take care of advances made in welding during the war. The book contains five sections; the first of which is an encyclopedia of welding. This is followed by an appendix containing tables and charts and the third section is a dictionary of trade names applying to the welding industry. A buyers manual follows this section and the encyclopedia closes with an index with cross references. McGraw Hill Publishing Co., 330 W. 42nd St., New York 18. 1024 p; $6.50.

* * *

"Management and Human Relations in Industry." A series of articles on industrial relations have been prepared by several authors, under the following headings: Management and the Public Weal, The Scientific Industrial and Political Economy, and American Heritage. Industrial Relations Publishing Corp., 1165 Broadway, New York 1. 103 p; $2.00.

Oxygen Jet Speeds Openhearth Steel Output

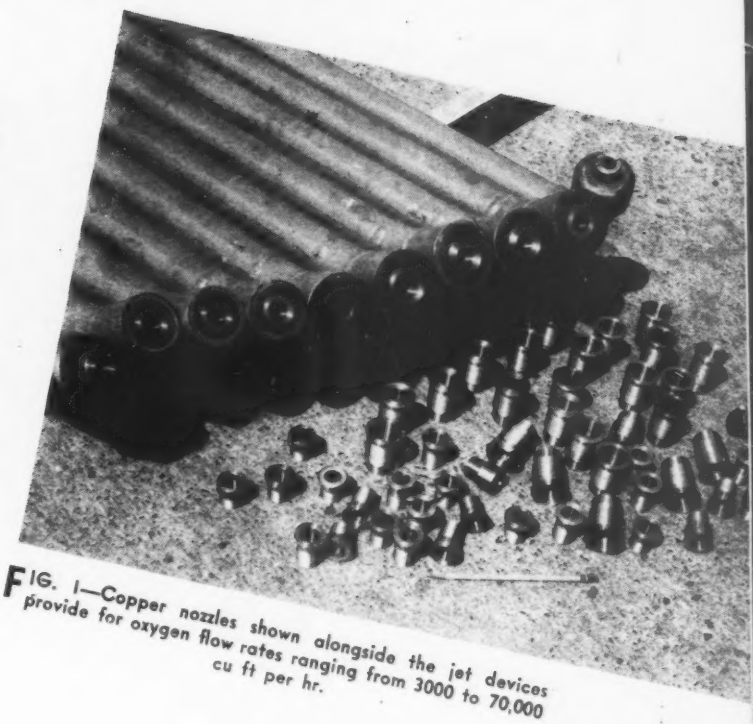

FIG. 1—Copper nozzles shown alongside the jet devices provide for oxygen flow rates ranging from 3000 to 70,000 cu ft per hr.

A NEW approach to the problem of utilizing oxygen in reducing melt-down time and decarburization time in the openhearth, involving the use of the Linde jet device, has recently been revealed by the Linde Air Products Co., New York.

Use of the jet device in reducing melt-down time, although it has been tried on only a relatively small number of heats, is said by Linde engineers to have indicated greater oxygen utilization efficiencies than have been secured with similar quantities of oxygen in end burners. In this method a high velocity oxygen stream is directed through the jet device at preheated scrap. The effect of the oxygen jet, which consists of a central oxygen supply pipe surrounded by two concentric water-cooled passages, see fig. 1, is to: (1) Cut down exposed portions of scrap rapidly, producing a small amount of superheated molten scrap steel; and (2) clear a path for the main burner flame and increase the area of charge exposed to the flame, thereby improving overall heat transfer from the main flame.

For articles on the use of oxygen in steelmaking, see THE IRON AGE, *"Use of Oxygen for Carbon Reduction," May 29, 1947, p. 66; "Steelmakers Weigh Oxygen Possibilities," May 1, 1947, p. 50; "Use of Oxygen in the Openhearth Bath," Feb. 20, 1947, p. 42; and "Oxygen in Steelmaking," Nov. 28, 1946, p. 47.*

The molten steel resulting from this reaction trickles down through the charge, thereby transferring the bulk of its available heat to the mass of the charge. The quantity of heat transferred is relatively small in comparison with the total heat required to process the charge in the openhearth. But, as normally less than 25 pct of main burner heat input is absorbed by the charge, heat added directly to the scrap in this manner is said to be several times as effective in melting scrap as the same quantity of heat liberated from the main burners.

In order to start melting scrap with the oxygen jet, sufficient preheating, to bring a considerable portion of the scrap charge to the ignition temperature, is performed with regular end burners operating with or without oxygen. This may require a period of time varying from 20 min to slightly less than an hour. Oxygen is then directed at the preheated scrap through the oxygen jet, inserted in the wicket hole of a charging door near the operating end burners, and is supplied at high velocity (oxygen pressure 75 to 100 psi) and flow rates ranging from 15,000 to 60,000 cu ft per hr. Rapid oxidation and melting require frequent adjustment of oxygen jet position for most effective performance. By this method, utilizing the self-sustaining combustion of the scrap to furnish heat, large craters about 7 ft in diam and 3 ft deep are said to be melted readily in a relatively short time.

When the jet device is operated through wicket holes, considerable interference with normal shop operation has been caused because the jets with their associated hoses prevent free movement of charging buggies and charging machines. For this reason, shops finding oxygen-accelerated scrap melt-down advantageous, will undoubtedly desire permanent installation of jets in a satisfactory position in the back or front wall, or possibly through the roof. Development work is now in progress on mechanical mechanisms for scrap melting with the jet device.

The jet device is usually placed in the furnace so that it is approximately 3 to 6 in. above the surface of the slag. The oxygen blown into the melt pushes the slag back and reacts with the metal below, causing violent agitation of the bath. This reaction is accompanied by the evolution of large quantities of brown fumes consisting of iron oxide, manganese oxide and calcium silicates.

While the injection continues, the bath begins to boil

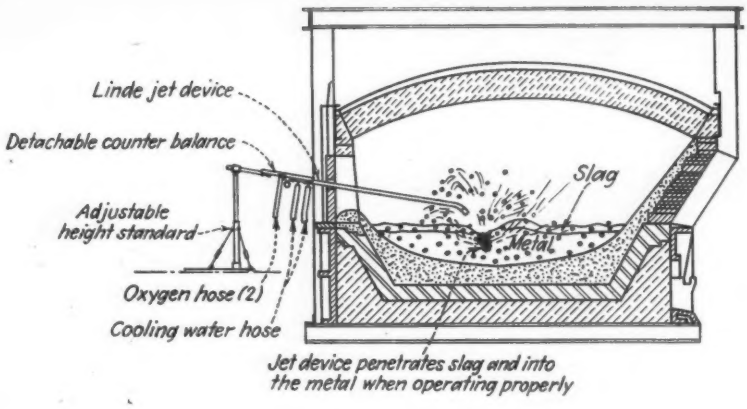

FIG. 2—Schematic layout illustrating use of the Linde jet device in carbon reduction in an openhearth furnace.

and bubble over its entire surface due to the rapid formation of large quantities of carbon monoxide shortly after the beginning of the oxygen injection. The slag becomes foamy as in a rapid ore boil, and frequently overflows the door banks unless they are built higher than usual. As the refining progresses, the slag level gradually subsides and the bath temperature rises. Heat input from the main burners is reduced from about one half normal fuel flow at the start of oxygen injection to zero as the bath and furnace gain temperature. By the time a low carbon composition desired for tapping is reached, the bath is comparatively quiet, with very small bubbles scattered generally over the bath.

For initial experiment, a simple installation through the charging door wicket hole is generally used to initiate oxygen jet injection. An installation, including the adjustable height standard, suggested for temporary use through a charging door wicket hole is shown in fig. 2. Permanent installation requires individual consideration in each mill because of widely varying conditions. Consideration should be given to roof, back wall, front wall, and possible end wall location of the jet device using remote controlled or manually operated mounting mechanisms. Orientation of the jet device is such that it points toward the center of the hearth, in order to minimize splashing of roofs and side walls with molten metal and slag.

Relative effectiveness of lance and jet oxygen injection, secured by operation in a 200-ton openhearth under as nearly constant conditions as possible, indicates, according to Linde, that the jet device is, on the average, more effective than oxygen injection through lances.

Use of Serrated Bell for Blast Furnace Charging

IN AN endeavor to improve distribution of the ore charge and at the same time insure proper gas flow distribution through widening of the ore annulus, a serrated bell was installed on the No. 1 McKeesport blast furnace of National Tube Co. in 1944. Experience with this bell and a brief history of early attempts at improving charge distribution were contained in the paper "Blast Furnace Bell Development," presented by T. H. Kennedy, assistant general superintendent, National Works, National Tube Co., at the recent general meeting of the American Iron & Steel Institute in New York.

The author pointed out that this patented bell is in all respects similar to a conventional bell except for the serrated section below the hopper seat and the mechanism for radial movement which is attached to the top of the bell rod.

Since this was the initial installation, the dimensions of the bell and its relationship to other components are the result of study rather than experience. No changes were made in the original 19 ft throat diameter on this first installation. There are six radial serrations of 10½ in. horizontal depth at 60° intervals around the edge of the bell. Bell diameter is 14 ft across the crest of the serrations and 12 ft 3½ in. at the trough of the serrations.

It is designed for 10° radial movement on each closing stroke of the bell or 60° from crest to crest in six successive dumps of the bell, thus forming a series of serpentine ridges adjacent to the furnace wall. It is interesting to note that because of velocity gained in sliding over the long overhang the depth of the serration in the ore ridge is approximately double that of the bell.

Since the fines of the charge tend to segregate along the crest of these ridges, they are thereby distributed over the much wider area bounded by the furnace wall and the trough of the serrations in the ore ridge. The average area of the ore-free center is also reduced in relation to the total area.

The bell is supported by a swivel head which encloses a roller thrust bearing upon which the T-shaped head of the bell rod turns. Radial movement is affected by a ratchet with an attached cam which travels in an oblique slot.

This mechanism has rendered satisfactory service for almost 3 years. By comparison with other furnaces of equal size in the same plant, and operating on similar burdens the performance has been very encouraging. The furnace has consistently demonstrated ability to take more wind per square foot of hearth than the other furnaces. Flue dust losses, good product yields and coke consumption compared exceedingly well with other furnaces of approximately the same size.

How to Use Carbide Cutters For Milling

. . . Rating Carbide Milling Jobs

. . . Determining Cutter Diameter

Continuing the discussion on the method of rating carbide milling jobs, three more examples from actual shop practice are analyzed in full detail, including a skinning operation on a large magnesium billet, in this, the 16th in a series of 20 articles on carbide milling. The method of selecting the most suitable size of milling cutter is also discussed by reference to one of the jobs rated, and it is shown that a larger diameter cutter does not necessarily reduce the milling time.

o o o

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Chicago

o o o

THE steps necessarily taken to the proper rating of a carbide milling job, to summarize the results of a previous discussion (see issue of June 12), are as follows: (1) Evaluate the job or workpiece, sectional area, holding facility, etc., in terms of removal rate; (2) match this rate with the horsepower available; (3) determine whether the resulting feed rate will yield the accuracy and surface condition specified.

A fourth factor enters into proper job rating, namely, setup. This will be discussed in terms of a milling operation on a large machine tool component of normal cast iron.

The discussion now proceeds in terms of shop and production line jobs. The above steps will be applied to each workpiece and operation.

Fig. 75 presents a milling operation performed on a large machine tool base. The material is normal cast iron of about 30,000 to 40,000 psi. Job rating this workpiece is effected along the following lines:

Obviously, no limitation exists in the job itself; here is a large chunk of cast iron approximately 45 in. wide, 150 in. long and in greatest thickness of section 12 in. Any metal removal rate possible in terms of the machine, the cutter and the cutting material is permissible.

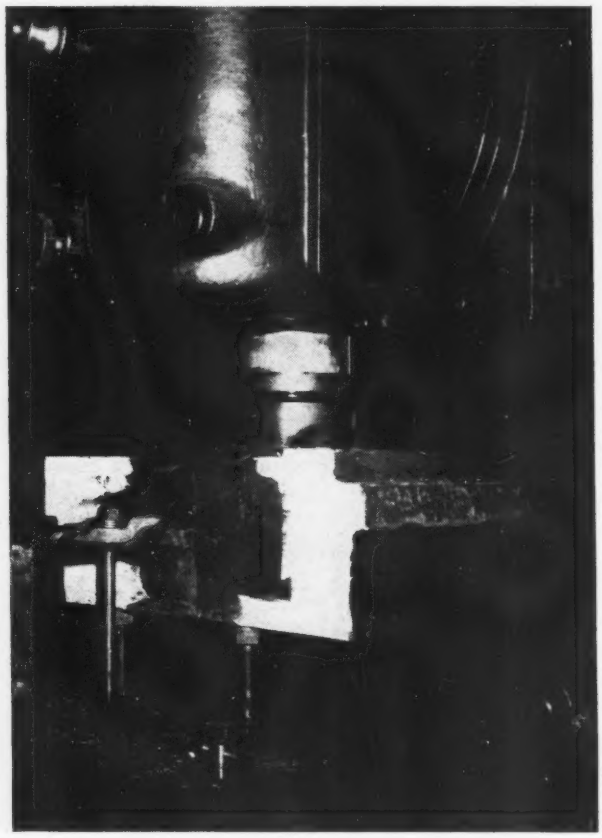
Nor does the setup present any limits. The large bedplate can be set down on the table of the planer type mill solidly and rigidly. And while clamping is necessary it is not as important as it frequently is in other workpieces. Regardless of clamping pressures no distortion will ruin the final checkup in the job. Moreover, the cutter, and with it the machine head, can be brought close to the job. There is no spindle overhang that inevitably sets up disastrous vibrations in the cross rail and which, transmitted to the cutter, voids both accuracy and finish requirements.

Rating procedure can get on immediately, therefore, to the one limiting feature in this operation; namely, the horsepower available in the machine tool itself. Thirty horsepower is available in this head; and all of it can be effectively used, considering the design of the cross rail and other members in this tool.

The metal removal rate, using the horsepower in the milling machine as the guide, will be 40 cu in. per min without overloading the machine. This job is being rated for steady operation of the equipment; it is entirely possible to use a more accurate K-Factor of

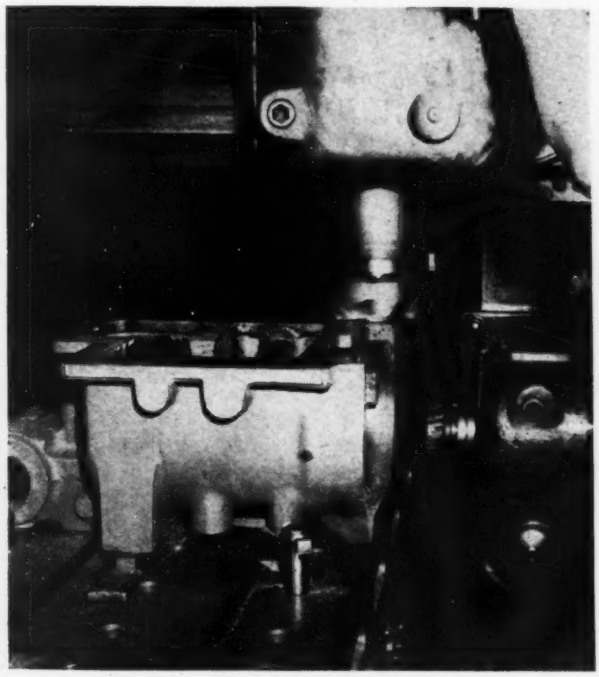
0.5 which would increase the rate to 60. But since this very likely represents the net horsepower per cu in. per min for this kind of milling job, and since it is impossible to estimate the effect of hard spots or chilled areas, the 30 hp motor would be overloaded, if not continuously, at least a portion of the time. This is not good practice.

With the metal removal rate set tentatively at 40 cu in. per min it is possible to calculate the ipm, the tooth load, etc., knowing the depth and width of cut. The latter is set by the use of an 8-in. cutter at 5 in., and the reason for the 8-in. diam choice will be discussed later. First, to check on the ipm and the tooth load. The depth of cut is 0.400 in. which is necessary to straighten out the surface to be milled. Variations in surfaces of large and long castings of this design are frequently as much as 0.600 in. but here it is less than 0.400 in. A width of swath of 5 in. results in a sectional cut area of 2 sq in. Since the removal rate is, for the moment, set at 40, the ipm is 20. A sfpm



of 300 is chosen for this sandy, and therefore, abrasive cast meterial; the rpm accordingly is approximately 140. The tooth load with an 8-in. eight tooth cutter is about 0.017 in. And this represents good practice. (The greater the chip load the fewer the tooth contacts with this destructively sandy workpiece and hence the greater the life. If the load per tooth could be doubled, namely, 0.034 in., so much the better from the standpoint of life. At the latter chip load each tooth would come into contact with the workpiece only half the number of times.

Checking now for accuracy and surface condition, using these operating characteristics, results in the following conclusion—based largely on experience—a feed per revolution of 0.136 in. (eight blades and 0.017 in. tooth load) is well within the range of good grinding practice necessary to obtain good finish and good accuracy. The latter specification is largely dependent however on the vibration in the machine, the workpiece and the setup; and all of these factors, as have been discussed, are entirely favorable to close tolerances and low microinch recordings. The removal rate of 40 cu in. per min can then be specified for this milling job.



ABOVE

FIG. 76—The design of this workpiece, with its relatively narrow milling surfaces and thin supporting walls, together with the considerable distance from the table to the cutter face, necessitates a reduction in cutting rate to about 10 cu in. per min.

o o o

LEFT

FIG. 75—Massive cast-iron workpieces of the type shown here impose no inherent limitations on metal removal, and the full power available in the machine may be utilized.

The width of the face to be milled on the job under consideration certainly justifies considering at least the use of a 12-in., or even larger cutter. The latter is ruled out immediately because of the increased cost of cutter care and maintenance. Few cutter grinders are capable of accommodating larger diameter mills, and while this argument does not hold for mechanically held blade designs, the blades of which are individually ground in a jig or grinding fixture, still the argument against large diameter mills is most valid for the following reasons:

First, the cutter diameter must never be larger than the largest effective gear in the spindle train. Otherwise, the flywheel effect of the cutter is greater than that of the gear, with disastrous results to the latter. It is necessary to underline the term largest effective gear since a bull gear not in motion is not effective in terms of flywheel capacity. And while larger ma-

chines have gears in the head of 12 in. and larger, still the smaller the cutter diameter in relation to the gear, the better.

Second, the tooth pitch, that is, the distance between cutting tips or blades, remains the same, or approximately so, as the cutter diameter increases. And yet there is a definite limitation to the length of chip that a carbide milling cutter can accommodate. The greater the width of cut the longer the chip, while at the same time the tooth pitch remains unchanged, and with it the chip accommodation space is likewise unaltered. Chip interference results in excessive abrasion and friction to the carbide cutting elements and hence in lowered life. No upper limit can be set to the width that can be cut since that in turn depends also on the depth of cut: The shallower the cut, the longer the chip that can be removed without interference. As the depth increases the length must be decreased for good operating results, particularly life.

Chip length is of no concern with cast iron, however, since the metal removed crumbles into small particles and needs no formation into what is referred to as a curled chip, as in steel milling. Hence it is possible in this job to consider the use of a 12-in. diam cutter. The largest effective gear in this head is considerably larger than this dimension. If an 8-in. wide swath is taken with a 12-in. cutter, then the sectional cut area is 8 in. x 0.4 in., or 3.2 sq. in. The resulting feed rate, at 40 cu in per min removal rate, is 12.5 ipm. The feed rate has been reduced therefore from 20 to 12.5 and the chip load from 0.017 in. to .007 in. approx. This latter operating feature is decidedly a change for the worse, since, as previously noted, the fewer the tooth contacts, the longer the carbide tip life. With the latter chip load there are necessary two and a half times as many contacts by each tooth as with the former tooth load.

Moreover, it is interesting to observe what has happened to the cutting time with the change in the feed rate from 20 ipm to 12.5 ipm as the cutter diameter increases from 8 to 12 in. and the width of cut increases from 5 to 8 in. The workpiece is 45 in. wide by 150 in. long. The length of travel of cutter for each pass is therefore 150 + 8, or 158 in. total. At an ipm of 20 the cutting time, actual, is 7.9 min. Nine cuts or passes are required to cover the 45-in. wide surface, and hence the total consumed cutting time is 71.1 min. Using a 12-in. cutter at 12.5 ipm and six 8-in. swaths, the total cutting time is 78 min. Hence the smaller cutter will yield better overall economy, particularly if the life factor is taken into consideration. Generally speaking, therefore, a decision to use the smaller cutter is more likely to pay off in terms of more successful milling by way of less time consumed and lower subsidiary costs such as cutter care and maintenance.

Limitations in Workpiece

Rating the job shown in fig. 76 presents other interesting considerations that result in the following approach: Removal rate based on workpiece design must definitely be limited. The faces to be milled are narrow, not more than 2 in. in widest portion, and the walls supporting these faces are relatively thin. Above all, the distance from the table to the point of cutter contact with the component is relatively large. Experience indicates a removal rate not greater than 10 cu in. per min, possibly a maximum of 15. Using the former for sake of conservative approach, this rate establishes the following operating characteristics: Sectional cut area equals 2 by 0.2 in. (depth of cut) or 0.4 sq in., resulting in an ipm of 25. This in turn yields a chip load of 0.020 in. with an 8-in. eight-tooth cutter. This diameter is necessary to cover the turns when the piece is being profiled, as will be explained later. The tooth load is based on an sfpm rate of 300 or a spindle speed of approximately 150.

It is necessary to give consideration to another factor when performing a so-called profiling operation, that is, using the longitudinal table feed simultaneously with the cross feed of head in order to swing the cutter around the corners of this component. When these two feed rates are 25 ipm, the actual rate of motion of the job into the mill is in the neighborhood of 35 in., or the square root of the sum of the squares of the individual feed rates. In other words, the resultant feed rate is the hypotenuse of a right-angled triangle in which the legs are equal to the table and head feed rates.

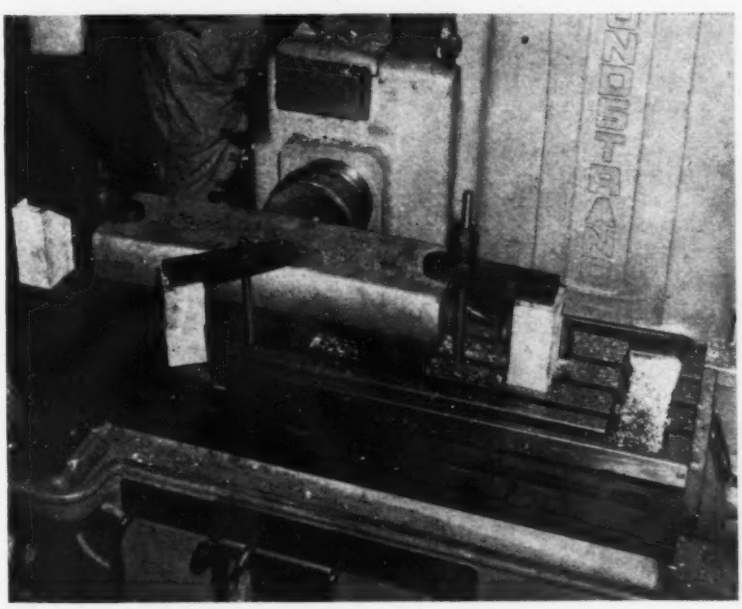
During this profiling cycle the chip load is almost equal to 0.030 in., and with even the momentary increase in power consumption, consideration must be given the motor and its stalling possibilities. However, here the K-factor is liberally chosen, so much so that a momentary increase in power demand will not result in any operating trouble.

Hence it is safe to rate this job, a cast iron case with relatively thin walls and a disadvantageous setup, at 10 cu in. per min.

The operation in fig. 77 brings to the fore entirely different considerations for the proper rating of this magnesium billet whose skinning has been specified at a microinch finish of 10 to 15.

The net power required at the spindle of a properly constructed milling machine to remove magnesium chips from such a billet is in the neighborhood of 0.1. That is 0.1 hp is required to remove 1 cu in. of this material each minute. Referring to table XIV (part 15, June 12, 1947) it should be emphasized that the factors listed there represent net

FIG. 77—Skinning this magnesium billet calls for the maximum speed possible in the machine, and stock can be removed at the rate of 175 to 190 cu in. per min.



horsepower consumption at the spindle, whereas the other factors are given as gross. The comment was made that the shop is interested in the gross figure rather than a somewhat theoretical net determination, since it is the total power the motor is called on to give that production personnel are concerned with. The 0.1 set down in this table is net and not gross; it is practically impossible to establish a figure for the total or gross power since this will vary decidedly with the spindle speeds used in this operation.

Perhaps a discussion of the operation presented in fig. 77 will clarify this difficulty. In this milling machine the unusually high spindle speed of 6000 rpm is available along with a rapid traverse table rate of 300 ipm. This adds up to the following interesting facts: At this spindle speed (6000 rpm) the idling horsepower required is 11. The total available is 25. When removing metal from this 5-in. wide billet at a 300 ipm rate and to a depth of 0.125 in., the metal removal rate is 187.5 cu in. per min. With a K-factor of 0.1 the power demanded at the spindle for cutting is 18.7 hp. The total power, therefore, is 29.7 which is about a 15 pct overload on this 25 hp motor.

The gross horsepower demanded for this operation on this machine is approximately 0.15 per cu in. per min. With these data available it is now possible to set up a rating procedure for this class of material.

The magnesium billet is nicely proportioned, can be readily clamped to the table, and the bed type machines selected for this job are ideal in terms of rigidity and, therefore, effective metal removal. There are no limitations, in other words, in the workpiece, the machine or the cutting material, including the cutter. The limit is reached only in the horsepower available in the machine tool. This feature has been thoroughly discussed; the production engineer need only realize that a large chunk of the power called for by an operation of this kind must go into revolving the spindle at these high rates. In fact, the K-factor of 0.15 is used, which results in using the top feed rate (rapid traverse) of 300 ipm or 5 in. per sec. Under these conditions the chip load is 300 in. ÷ 8 (blades in 8-in. cutter) ÷ 6000 rpm; this equals in round figures 0.006 in.

It is important to appreciate that a microinch finish in the neighborhood of 10 results only from a relatively low chip load, other conditions being satisfactory.

Cutter life is determined not by dulling of blades but by a certain loss of keenness of the cutting edge that quickly shows up in loss of surface condition. Certainly this is far different from the dulling that takes place when the ferrous materials are machined. Instances are on record where carbide cutters have operated for a month on these nonferrous materials without evident damage or even essential change to the cutting edge.

This operation calling for the skinning of a magnesium billet can be rated, therefore, in the neighborhood of 175 to 190 cu in. per min.

The application of this rating method to carbide milling jobs, insures, first, that the machine will neither be over nor underloaded; both are unsatisfactory, the former may result in stalled spindles and damaged cutters, the latter in uneconomical use of prime machine tool equipment. Second, this method takes into account all the vital factors that affect good milling practice; namely, rigidity in the workpiece, the machine and the setup, and it, finally, insists upon due consideration being given to the important specifications of accuracy and surface condition.

Part 17 of this series on carbide milling will appear in the next issue.—Ed.

Previous articles in this series covering carbide milling were as follows:

Part No.	*Subject*	*Issue Date*
1.	Fundamentals of carbide milling.	Feb. 13, 1947
2.	Low carbon steel and wrought iron.	Feb. 20, 1947
3.	Straight carbon and cast steel.	Feb. 27, 1947
4.	Heat-treated steels.	Mar. 6, 1947
5.	Armor plate, heat-treated alloy steel, stress proof steel, die plates.	Mar. 13, 1947
6.	Stainless steels.	Mar. 20, 1947
7.	Semisteel, Ni-Resist, alloy cast iron.	Mar. 27, 1947
8.	Factors governing cutter life, selecting feed rates.	Apr. 10, 1947
9.	Regulating life between grinds, cutter design.	Apr. 17, 1947
10.	Factors involved in good practice.	Apr. 24, 1947
11.	Tool grinding, reconditioning and blade setting.	May 8, 1947
12.	Converting to carbide milling.	May 15, 1947
13.	Planning carbide milling operations.	May 22, 1947
14.	Analyzing the workpiece, establishing feed rates.	June 5, 1947
15.	Rating carbide milling jobs.	June 12, 1947

Corrosion Prevention by Vapor Type Inhibitor

ONE of the most troublesome factors confronting manufacturers has been, and continues to be the prevention of corrosion on finished parts during storage and shipping. Slushing oils are, of course, quite effective, but there are often objections to using these, particularly when parts are enclosed in a housing and cannot easily be reached for removal of the compound.

A completely new approach to the problem of corrosion prevention is represented by a substance known as CS-CI-501, recently introduced by Charles Stevens & Co., 2018 Crotona Pkwy., New York 60, N. Y. Furnished as an alcoholic solution, the substance vaporizes, and so long as the vapor is present in the atmosphere surrounding the work, corrosion is said to be completely inhibited. Even when moisture condenses on a steel surface, corrosion is prevented because the vapor dissolves in the condensed water and renders it noncorrosive to steel.

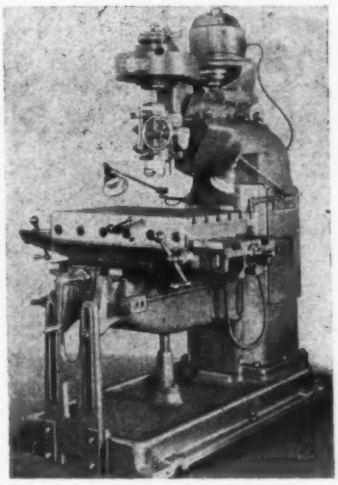
To be effective, there must be no circulation of air to carry away the vapor, and a convenient means of effecting protection is by wrapping the work in paper impregnated with the compound. Wrappers, cartons, inserts or spacers can also be impregnated by spraying the inner surface and allowing the solvent to evaporate. For protection of equipment or materials in process, heavy cloths may be impregnated and used merely as covers. The inside of tote boxes can be sprayed and covered to prevent air circulation. This is particularly useful for storage between operations involving several dry grinding operations.

New Equipment . . .

Vertical milling machines, automatic lathes, heavy duty honing machines, and several machine tool accessories, together with an automatic shop furnace, induction heating generator, small parts segregator, photoelectric counter and such shop equipment as friction clutches, circulating pumps and motorized valves are featured in the following pages.

Vertical Milling Machine

A HEAVY duty milling machine suitable for high speed milling, routing, and die sinking work has been offered by *Reed-Prentice Corp.*, Worcester 4. Its wide range, versatility and rugged construction make it suitable for work on plastic and rubber molds, diecasting dies and forge dies; even tire molds are well within its capacity, it is said.



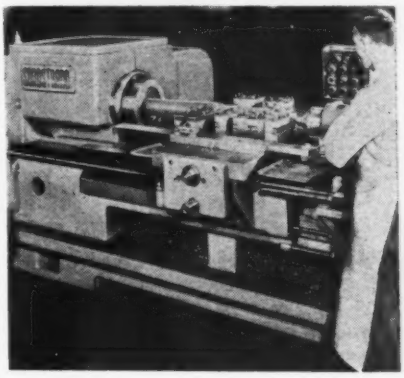
The machine features head mounted on horizontal ram for wide range forward and back. V-belt drive is said to assure smooth chatterless operation for die sinking work at high or low speeds. Rigidity of head and spindle construction permits use of large diameter or two lip cutters. The machine is powered by a 3 hp, 1200 rpm, 60 cycle, or 3 hp, 1000 rpm, 50 cycle, motor mounted on the ram. Drive to the spindle is by V belt direct from motor to spindle. Both pulleys are 4 step, the spindle pulley being equipped with back gears. Ten speeds may be obtained with open belt within the range of 400 to 2600 rpm and five speeds may be obtained with back gears within the range of 133 to 320 rpm. Longitudinal feed is 27 in., cross feed, 20 in. Table measures 32 x 22 x 4 in.; throat depth is 30 in.; vertical travel of spindle is 5 in.

Drill Press Equipment

PNEUMATIC operating equipment supplied in the form of a kit and pre-engineered for quick and easy installation on drill presses has been announced by *National Pneumatic Co.*, Rahway, N. J. The kit, No. DC-40730, consists of an operating assembly which includes air engine, pressure gage, pressure regulator, exhaust valve, and cushioning plug, together with foot-operated control valve, air strainer, cut-out cock and flexible hose. The engine provides controlled air power which can be adjusted to suit any drill size or stock and to permit maximum drilling pressure and speed within safe limits.

Automatic Lathe

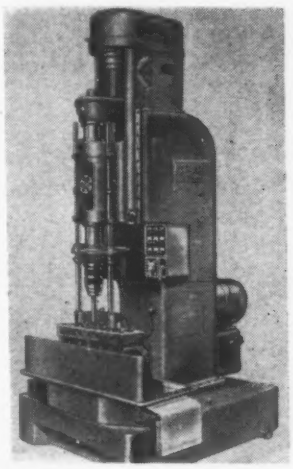
MODEL 16 automatic lathe has been added to the present line of lathes manufactured by the *Sundstrand Machine Tool Co.*, Rockford, Ill. The lathe embodying most of the basic design features



of the company's Model 8, 10 and 12, is provided with a 75 hp motor. It has a 17-in. swing over slides, will swing a 21-in. diam chuck. Machines can be furnished in three bed lengths of 36, 60 and 84 in. between centers. Quick cycle changeover makes it possible to multiple tool this lathe for short runs as well as for production turning, and it can be used for either shaft turning jobs or chucking work.

Honing Machine

ANNOUNCEMENT of a newly developed unit-constructed, single spindle, heavy duty honing machine with quill type spindle for



honing bores from 1 to 4 in. diam up to 9½ in. long, has been made by *Micromatic Hone Corp.*, Detroit 4. These machines feature three units assembled on the column and base of any other Micromatic microhoning machine: The head unit consisting of the spindle, hydraulic control panel, stroke control mechanism, and speed control transmission, all in one integral assembly; the hydraulic unit comprising the hydraulic pump, tank, and pressure control valves; and the electrical control panel. To permit faster stroking without increased power input and to accomplish faster and more efficient stock removal, all weight that must be reciprocated to stroke the tool has

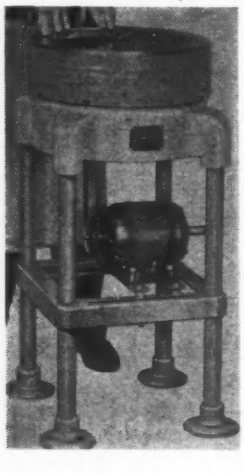
been minimized, it is said. All head and guide bars have been eliminated; the spindle is the piston rod with rings that act as the piston. Stroke control is direct without linkages or levers.

Crankpin Turning Machines

DESIGNED for turning crankpins on large, diesel type crankshafts, turning machines which completely cheek, turn and fillet crankpins of bearings from rough forgings to finish sizes with an accuracy of 0.001 in. have been announced by *Wickes Bros.*, Saginaw, Mich. In this type of machine the crankshaft is set up on stanchions and the cutting tools revolve around the crankpin being machined. The crankpin can be completely finished and polished in the lathe without change of setup, it is said. Depending upon production requirements, these machines are also recommended for final finish only, rough turning being done on higher production Universal type lathes. The complete line of pin turning machines include the No. 26, 35, 40, 66 and 74 sizes ranging in weight from 27,000 to 240,000 lb.

Flat Lapping Machine

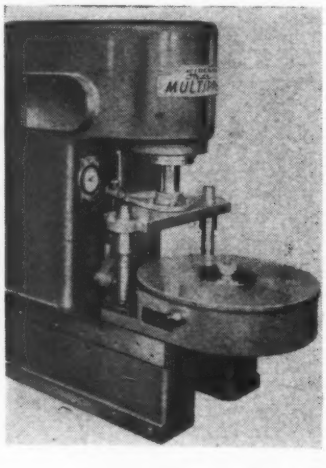
DESIGNED and built for flat lapping operations on both large and small surfaces, a precision machine has been manufactured by *Spitfire Tools, Inc.*, 2933 Pulaski Rd., Chicago 41, which is



said to produce the perfectly flat planes necessary in sliding and rotating parts, air and liquid tight seals, flat surfaces of plastic molds, drawing dies and pressure pads. It is possible to obtain a surface finish as fine as 2 microinches rms with this machine, it is reported. Single pieces ordinarily require no holders, chucks or collets. Production lapping of large quantities of small parts may be accomplished by using standard or special holders.

Dial Feed Table

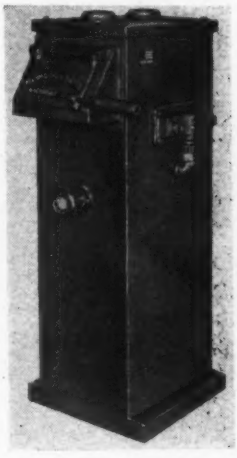
FASTER and more efficient feeding of small parts to the pressing station of the Multipress, is claimed for the dial feed accessory manufactured by the *Denison Engineering Co.*, 1160 Dublin Rd., Columbus 16. This dial feed provides a mechanical type of operation, with the dial actuated with each retracting stroke of the press ram by mechanical linkage which is connected with the banjo type arm on the ram. The actuator may be adjusted to change the ram stroke to



provide either 8, 12, or 24 indexes per dial revolution. An ejection station may be used for ejecting parts beneath the table. Tooling is required at the pressing station only.

Automatic Shop Furnace

AN automatic shop furnace manufactured by *Eclipse Fuel Engineering Co.*, 743 S. Main St., Rockford, Ill., has been redesigned and is now made of fabricated steel instead of castings. The unit is fully enclosed and the arrangement of the working parts has been streamlined. The McKee Eclipse centrifugal blower is driven by a direct-connected motor, no transmission is required. A McKee proportional mixer automatically regulates the proportion of gas and air. Control dial is located at the front of the furnace. The furnace has been designed for small shops requiring a small toolroom furnace for hardening punches, dies and



small tools. Carbon and intermediate steels, as well as high speed steel can be handled satisfactorily, it is said.

Carbide Burs

TO meet the requirement of carbide burs larger than the ⅛-in. size, the *Atrax Co.*, 240 Day St., Newington 11, Conn., has announced a line of ¼-in. burs with ⅛-in. heat-treated steel shanks which are available in a set of nine sizes. These burs are designed for use with a coolant which produces a smoother finish for better chip clearance and which eliminates heat checks, surface cracks and crumbling of cutting edges frequently resulting from dry grinding.

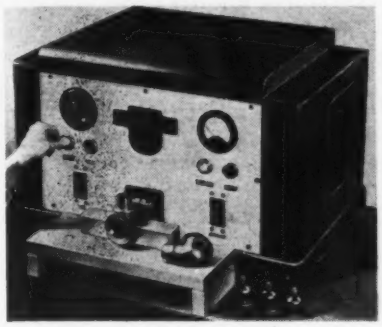
Centerless Grinder Blades

FOR use when grinding stainless steel, Monel metal, aluminum or other materials that pick up or score easily, Ampco Bronze centerless grinder blades announced by the *Foulk Mfg. Co.*, 4208 Airport Road, Cincinnati 26, are available from stock to suit most standard Cincinnati centerless grinder work rests. Quick change insert-type construction is used enabling use of one or two blade bodies with many inserts to maintain high production at minimum blade cost.

Induction Heating Generator

KNOWN as the Ther-monic Model 43, a bench-type induction heating generator has been announced by the *Induction Heat-*

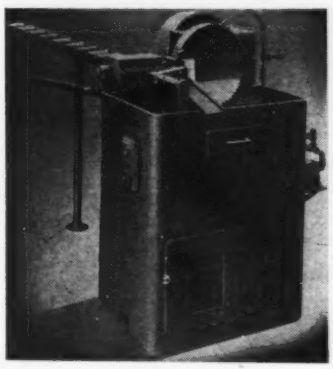
ing Corp., 389 Lafayette St., New York 3, which combines the power section and work applicator in one unit as a source of high-frequency energy to speed up hardening, brazing, soft-soldering, annealing and melting operations. It is ready for



operation by simply plugging into any 120 v, 60 cycle, single phase power supply outlet. Model 43 has a full-load output of 43 Btu per min which is equivalent to approx 750 w at a nominal operating frequency of 450 kc per sec. The unit is engineered for continuous full-load operation in the production line or for short run work. Coil leads are designed to facilitate frequent work changeovers involved in spot production, experimental or toolroom jobs. Need for water-cooling of work coils or for any adjustments on the generator unit when changing from one coil to another has been eliminated. Controls provide for automatic or manual operation.

Metal Sawing Machine

A METAL sawing machine, the No. 22, has been added to the series for ferrous and nonferrous



metals and plastics, manufactured by the *Cochrane-Bly Co.*, 7 St. James St., Rochester, N. Y. It is said to have high efficiency for stock up to 2 in. in diam. Flexibility of design makes possible increased sizes and capacities for special stock sizes and production needs. Extreme rigidity and precision construction are said to make it practically vibrationless, resulting in clean, smooth burless cuts that seldom need milling or finishing. Automatic, semiautomatic and hand-operated models are available.

Air-Dry Rack Coating

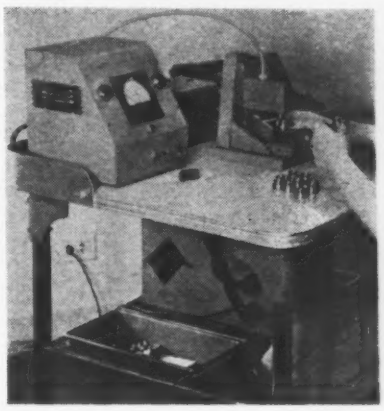
RACK COATING 266, announced by *U. S. Stoneware Co.*, Akron 9, is said to cut the time required to apply air-dry rack coatings approx 75 pct, with two dips of rack coating 266 usually ample to build a coating sufficiently thick to provide adequate protection, it is reported. It is resistant to all plating solutions, including hot alkaline cleaners, and requires only 20 to 30 min drying time per coat. Coating 266 is said to possess excellent adhesion to all surfaces and is flexible and resilient to withstand mechanical shock in handling.

Plastic Coating

A VINYL type coating has been perfected by *Heil Process Equipment Corp.*, 12901 Elmwood Ave., Cleveland 11, for tanks and rack fixtures used in the plating and chemical industries. The coating, designated as Heilex 445, is said to have a well defined resistance to chemicals and is noted for its tough surface and high bonding characteristics. Acids such as sulfuric, hydrofluoric, hydrochloric as well as nitric and chromic oxidizing acids are reported to have no deteriorating effect. Physically, this plastic is rubbery and tough. It resists abrasion and rough handling and if damaged by sharp objects can be repaired on job site with a patching material. Another property of Heilex 445 is the negligible effect of temperatures up to boiling. It is available as a lining also.

Small Parts Segregator

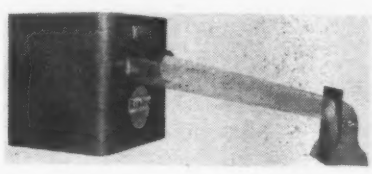
AUTOMATIC inspection of small parts is possible with the Selector announced by the *DoAll Co.*, Des Plaines, Ill. Model DS-20 shown is an electronic segregator for the automatic sorting of small parts into three classifications, oversize, acceptable and undersize. Said to be accurate to 0.000010 in. the Selector will sort parts with tolerances from ±0.0001 to ±0.005 in. at speeds up to 12,000



parts per hr. Because of its unique electrical circuit the speed of operation is limited only by the rate at which parts can be fed into the Selector. Fully automatic and semiautomatic feed mechanisms are available. Besides having red and green indicating lights the master control unit has a graduated indicating dial gage providing visible readings of the size of each part as it is being sorted. Model DS-20 comes as a packaged unit ready for operation.

Photoelectric Counter

NO. 153 photoelectric counter developed by the *Ripley Co., Inc.*, Middletown, Conn., has been designed for high speed counting work in industries such as automotive and tire manufacturing. Long leads and excessive wiring have been eliminated by combin-



ing light source, phototube and counter in one housing. Control operates on interruption of reflected light from a swivel type, adjustable chrome reflector. Sensitivity adjustment is made for various light intensities through an aperture in the housing. The relay has been designed to carry a load of 3 amps continuously for 8 mil-

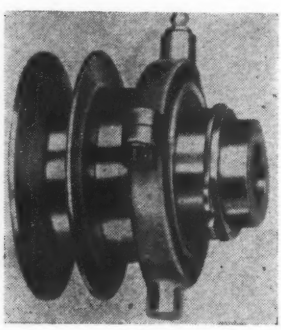
lion impulses. Minimum time for one cycle is 0.08 sec or 700 cycles per min and minimum duration of beam interrupting a 1-in. object is 0.02 sec. Minimum light intensity is 2-ft candles and maximum light intensity for larger, slower moving objects is 1½-ft candles. Maximum number of counts before returning to 0 is 99,999. The unit operates on 115 v, 60 cycle current.

Flexible Aluminum Tubing

PRODUCTION of flexible aluminum tubing for connecting gas appliances to house piping and for use on appliances and accessories has been resumed by *Reynolds Metals Co.*, 2500 S. Third St., Louisville 1. This tubing is supplied in 2S-O and 2S-1/2H aluminum in OD ranging from ¼ to 1⅛ in., both in straight lengths and in coils. This material is approved by the American Gas Assn. and meets the requirements of American Standards Assn.

Friction Clutch

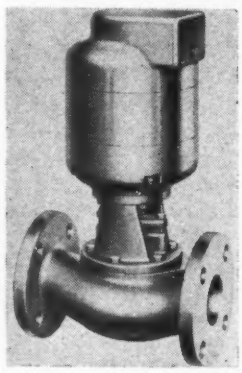
A V-BELT friction drive clutch has been designed by the *V-Belt Clutch Co.*, 3757 Wilshire Blvd., Los Angeles 5, to grip or release directly on V belts. The Ball-lok clutch units, complete in themselves, may be used either as driving or driven pulleys. In operation, the positive, smooth clutching action is the grip of the side-



walls of the pulley against the belt. When the clutch is opened, the belt slackens and idles on a free-running, grease sealed, ball bearing, with no attendant belt drag or creep, it is reported. The clutches are suitable for application in connection with internal combustion engines, motors, tractors and many types of machines where compactness, light weight, controllability, dependability and safety are requirements. Four sizes have 3¼ to 5-in. sheave diam, and are 2 15/16 to 3 1/16 in. in overall length. Weights range from 44 to 54 oz.

Circulating Pump

MODEL 1-B Rumaco circulating pump developed by the *Ruthman Machinery Co.*, Cincinnati 2, features a totally enclosed



driving motor direct connected to the pump and equipped with grease packed, sealed precision ball bearings. The motor stator is dynamically balanced by dynetric process to extremely close limits, insuring vibrationless and quiet operation, it is said. The pump, built on centrifugal principles, is provided with opposing inlet and outlet for standard 2-in. pipe flanges. The unit can be installed in a pipe line of various sizes by use of pipe reducers, and can be operated in any intermediate angle from a vertical to horizontal position.

Motorized Valve

A COMPACT motorized valve has been announced by *Automatic Temperature Control Co.*, Philadelphia 44, especially adaptable for commercial machinery and equipment, heating and air conditioning systems, heating and cooling coils, etc. It provides automatic two-position operation of valves for steam, air, gas, oil or water. An induction type motor develops a positive power-drive through a worm and spur gear reduction. Limit switches are adjustable. Electrical connections are made to a terminal block; a ½-in. threaded conduit is provided. Valves are globe type, either single or double seated in sizes ½ to 2½ in. screw-end connections, and butterfly valves, in sizes 1 to 4 in., either screwed or flanged ends.

Demand Mask

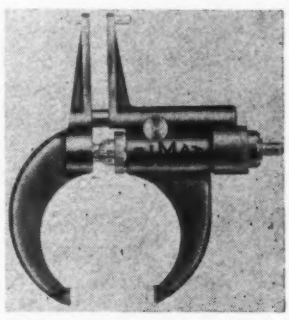
FOR short duration protection in gaseous or oxygen deficient atmospheres, a selfcontained breathing apparatus, the front-type demand mask, has been made by *Mine Safety Appliances Co.*, Pittsburgh 8. Weighing 13½ lb, the mask has an 11-cu ft capacity high pressure cylinder which has a service life of 8 to 10 min. Attached to the cylinder is the demand regulator, delivering an oxygen flow exactly as needed by the wearer, it is said. The cylinder is held in place on the wearer's chest by an adjustable web harness. Oxygen supply is continuously registered on a pressure gage attached to the regulator.

Gravity Conveyor

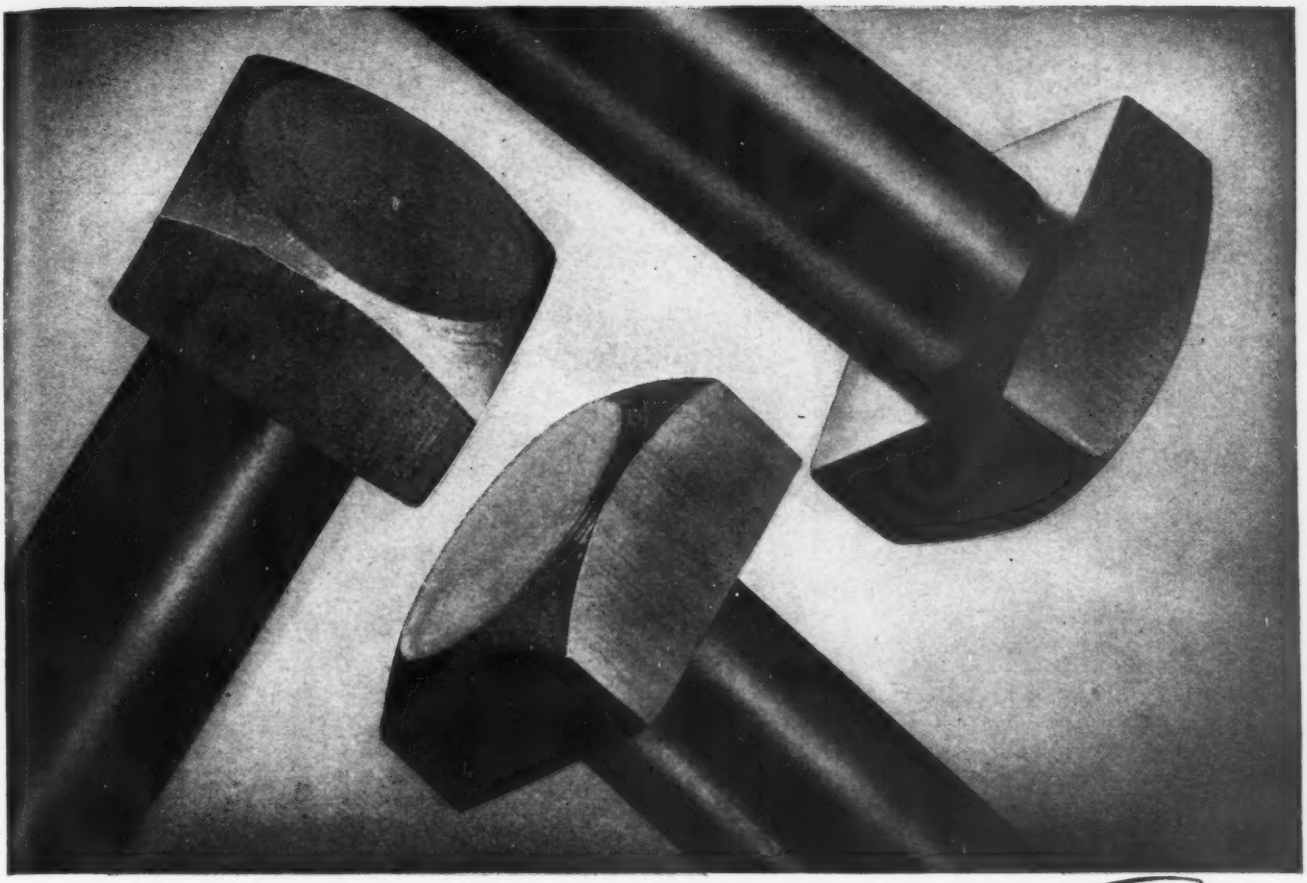
A TELESCOPIC gravity conveyor which folds up to 10-ft length has been introduced by *Wilkie Co.*, 5520 Arch St., Philadelphia. The conveyor can be moved from one operation to another and adjusted for height and incline to meet different requirements. It is available in three sizes, 10 to 20 ft, 10 to 30 ft, and 10 to 40 ft. A pressure break lock holds the conveyor firm while in use. The conveyor is said to be especially useful for conveying packaged goods of all kinds on short hauls.

Micrometers

INTERNAL and external measurements are possible with the Rimat duplex micrometer produced by the *Richards Machine Tool Co.*, 124 S. Isabel St., Glendale 5, Calif. Positive reading provides



speed and accuracy on the job. The micrometer is made in three sizes: 0 to 1 in., 1 to 2 in., and 2 to 3 in. Special sizes are also available. Ends of the measuring pins are hardened and ground on a radius for accuracy and to prevent cramping. All wearing surfaces are hardened and ground.



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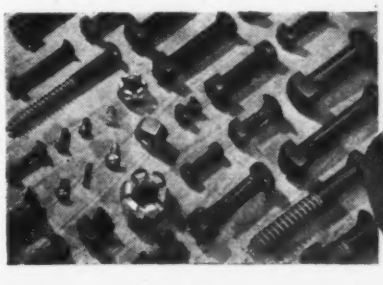
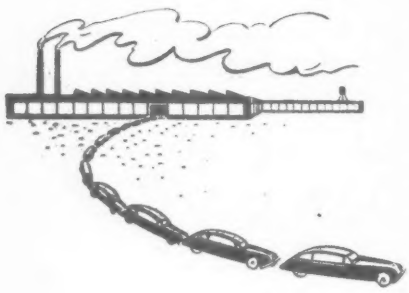


Assembly Line . . .

WALTER G. PATTON

• Labor unrest seen in Detroit as Taft-Hartley bill awaits President's signature . . . Henry Ford II writes to his striking foremen . . . Resale of new cars is a headache to auto dealers and producers.



DETROIT—As the Taft-Hartley act goes to the President for signature or veto, this is the labor picture in Detroit:

Ford is losing production of 450 cars per day as a combined result of labor trouble in the pressed metal shop and a foremen's strike.

Hudson lost more than 550 cars per day for several days because of refusal of 15,000 UAW-CIO production workers to cross picket lines of a UAW office workers' union. (UAW workers continued, however, to cross picket lines of striking FAA members at Ford's Rouge plant).

Continental Motors Corp. was paralyzed by a "sitdown" strike that halted operations for a day.

For the past several weeks, production in several of Continental's machining departments has been falling off. When production faded to a practical halt, the management is reported to have told the workers to go home. Many workers refused to go at first but all had left the plant by the end of the day. Workers returned the following morning and production was resumed although on a somewhat restricted basis.

Actual or anticipated materials shortages were not a factor in the work stoppage at Continental, it is reported. Meanwhile, the union has protested vigorously to the use of the word "sitdown" in describing the work stoppage.

Two departmental "sitdowns" are said to have taken place at Continental within the past week. The company is attempting to insert a productivity clause in its labor contract and the recent demonstrations have been attributed by some sources to this company demand. Another assigned reason for the labor protest at Continental was the disciplinary action the company has invoked on several of its workers because of earlier work stoppages.

The "white collar" strike at Hudson is over wages. According to a company spokesman, "a substantial raise by the company has been rejected by the union."

AT the present time, Ford is producing no Ford or Mercury cars at its River Rouge plant. Suspension of car assemblies was attributed by the company to a "slowdown and sabotage" by 150 workers in the body line in the pressed steel department. (Sabotage is reported to include the wrecking of a large welding jig, halting of conveyor lines, etc.)

When trouble developed, Ford immediately sent the workers in this department home. However, the company is continuing to operate a second shift in this department. This has precipitated a UAW-CIO charge that Ford "is attempting to play one shift against another.

An interesting aspect of the present Ford labor trouble is that most of the trouble seems to be concentrated around a few men in the pressed metal department.

Meanwhile, the Ford foremen's strike is going into its fourth week. Company officials claim that during the 3 weeks of the foremen's strike, production has fallen just 2.5 pct behind schedule. Since May 21, Ford said, the company has produced 62,906 units against a schedule production of 64,400 units. Ford also explained that during this period the Mercury line at the Rouge was shut down for a week because Murray Corp. was unable to furnish frames and body parts.

It should be noted that thus far Ford operations in its 13 branch assembly plants are unaffected by the Rouge labor difficulties except indirectly and that only the assembly line serving a limited area of the country has thus far been seriously affected. Parts production is being carried on as usual, Ford says.

Henry Ford II may not break the foremen's strike but he is not going to give in anywhere along the line without a stiff fight.

This week the younger Ford sent individual letters to all Ford foremen, thanking them for writing and promising to reply *in person* to each foreman who has written to him during the current crisis. (There are about 4000 Ford foremen.)

Ford's letter was refreshingly frank and friendly—and the company's position has not changed one iota since the foremen's strike started.

"I agree with those of you who have expressed the opinion that the foremen's union grew out of past injustices and the failures by past management," Ford said. "But we are trying to make things different around here, and they are going to be different. Frankly, I do not like to see men who are Members of Management taking any part in a strike."

FORD'S second point—an analysis of the issues involved in the strike—was aimed to attract the reasonable heads in the union.

"In analyzing demands of the Foremen's Assn. which brought about this strike," the younger Ford said, "such as a dues checkoff, inclusion of general foremen in the union, exclusive bargaining rights, and promotion governed by seniority instead of merit, I am wondering if you realize that if we are to grant every one of these demands we would not be doing one thing for the individual welfare of

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Performance and reputation are the best references for a machine tool. In hundreds of shops the P&W Jig Borer has justified its reputation for fast precision boring on jobs ranging from small drill jigs up to and beyond the large punch and die set shown here. You know at a glance the accuracy that *must* be built into a job like this. Yet it's all in the day's work for the shop that has the right precision boring equipment.

You need to see the P&W Jig Borer in action to know all it can do. We can tell you of a nearby installation which we can arrange for you to visit. At our own factory we can show you the exquisite precision we build into every part. We will be glad to send you complete literature. If you do precision boring you need to know the Pratt & Whitney Jig Borer.

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our foremen. These demands which have caused you to be out of work for three weeks would benefit only the Foremen's Assn. and would do nothing for you as an individual."

Simultaneously through the newspapers, Ford let its foremen know that they have already lost an estimated $900,000 in salaries.

Ford also lets foremen know the company has other things in mind for them.

"We have plans for you that are not going to be affected by the strike," Ford continued . . . We have established a department of management relations which has been given the responsibility of developing plans and programs covering all phases of our relationships with foremen."

Ford concluded by saying that a series of meetings is planned for foremen where the full details of the plan will be announced and inviting the foremen to continue to write to him.

Accompanying the Ford letter was one signed by John Bugas, vice-president and director of industrial relations, assuring the foremen that the company will not retaliate against striking foremen, that a 10 pct raise will become effective as soon as the foreman returns to his job, and that an adjustment of wages is in preparation "to take care of inequities and to allow for merit increases within a department."

Whether this appeal to Ford foremen to return to work will prove effective is difficult to predict. Undoubtedly Ford has most of the logic on its side but several foremen who attempted to return to work have already been beaten in the plant and some have been followed to their homes. More of the same treatment may be in store, particularly for those who earned the "scab" derision of their fellow workers by trying to return to work now.

AT the same time, there were indications that FAA may make a strong appeal to the UAW-CIO to respect its picket lines, in which case a Ford shutdown would automatically follow.

The big question at the moment seems to be—will big UAW-CIO pull little FAA'S chestnuts out of the Ford fire? To many observers the FAA chestnuts are already a little burned.

The automobile industry sees little hope of curbing the situation in which new cars are being resold at hundreds of dollars over the published price. Although car companies have been urged to screen their orders in order to weed out duplicates and to avoid delivering cars where there is cause for believing the vehicle may be resold at a speculative profit, the problem of handling new car sales continues to be a headache.

As one spokesman for the industry declared, "It appears obvious that the resale situation will be completely corrected only through return of better balance between supply and demand with the result that fewer people will be bidding up car prices at figures beyond those recommended by the manufacturers."

Automobile companies have devoted considerable time checking reports brought to their attention, and many sales have been traced in order to determine the point of original sale and subsequent resale. In many cases it is found that cars have gone through a number of hands within a short period after being sold to the original purchaser. Here are some examples:

A SOUTH CAROLINA distributor recently delivered a new automobile to the Mayor of his city. No turn-in was involved. Shortly thereafter the Mayor sold the new car to a used car dealer at an estimated profit of $1300. Several months later the Mayor asked the dealer to obtain another new car for him. He was told he could not receive another car "until new cars were standing on the salesroom floor and were hard to sell."

A dealer in Montclair, N. J., recently delivered a convertible coupe to one of his customers. The customer started to Florida for a vacation. Enroute he paused in Norfolk to visit some friends. The car was reported in the hands of a Norfolk used car dealer less than a month after it was delivered in Montclair.

Two customers recently bought new automobiles from a new car dealer in northwest Ohio. The cars were driven to west Texas by the purchasers and resold for a profit of $325 each to a used car dealer.

One motor car manufacturer found four of his new models on a West Coast used car lot. A search disclosed that all of the cars had been delivered to dealers in Detroit who sold them to customers who had waited their turn on the dealers' lists. The cars had been resold for transport to the West Coast and resold at premium prices. Other cars on the used car lot had come in similiar fashion from Buffalo, Chicago and Philadelphia.

An official of a department store asked prompt consideration to receive a car which was alleged to be essential to his business. When delivery was made, he promptly resold the car at a premium price to a used car dealer in the same town.

The most flagrant violation turned up was that of a clergyman in Chicago, who had placed multiple orders and had denied to a dealer that he had received delivery of a single new car. The dealer's investigation disclosed, however, that he has actually secured 13 new cars over a period of several months. He was selling them through a used car lot he himself had set up for the purpose.

•

K-F Signs With UAW

Detroit

• • • **Kaiser - Frazer Corp.** has signed a new wage contract with the UAW-CIO extending to May 1, 1949. Following the steel and auto industry wage pattern, the Kaiser-Frazer contract provides for an 11½¢ per hr wage increase and six paid holidays.

The new contract affects 10,000 employees of Kaiser-Frazer Corp. and Graham-Paige Motors. Henry J. Kaiser, K-F chairman and Joseph W. Frazer, president of K-F and Graham-Paige, signed for the companies.

Kaiser-Frazer plans to continue its security trust fund under which the company pools $5 for each automobile shipped and distributes the accumulated sum of money to eligible workers at Christmas time. More than $250,000 has already accumulated in the 1947 fund. It is predicted that in excess of a million dollars will be in the fund by Nov. 23, date set for the accounting of the pool.

The new wage agreement includes engineering and office workers and has been ratified by the union membership.

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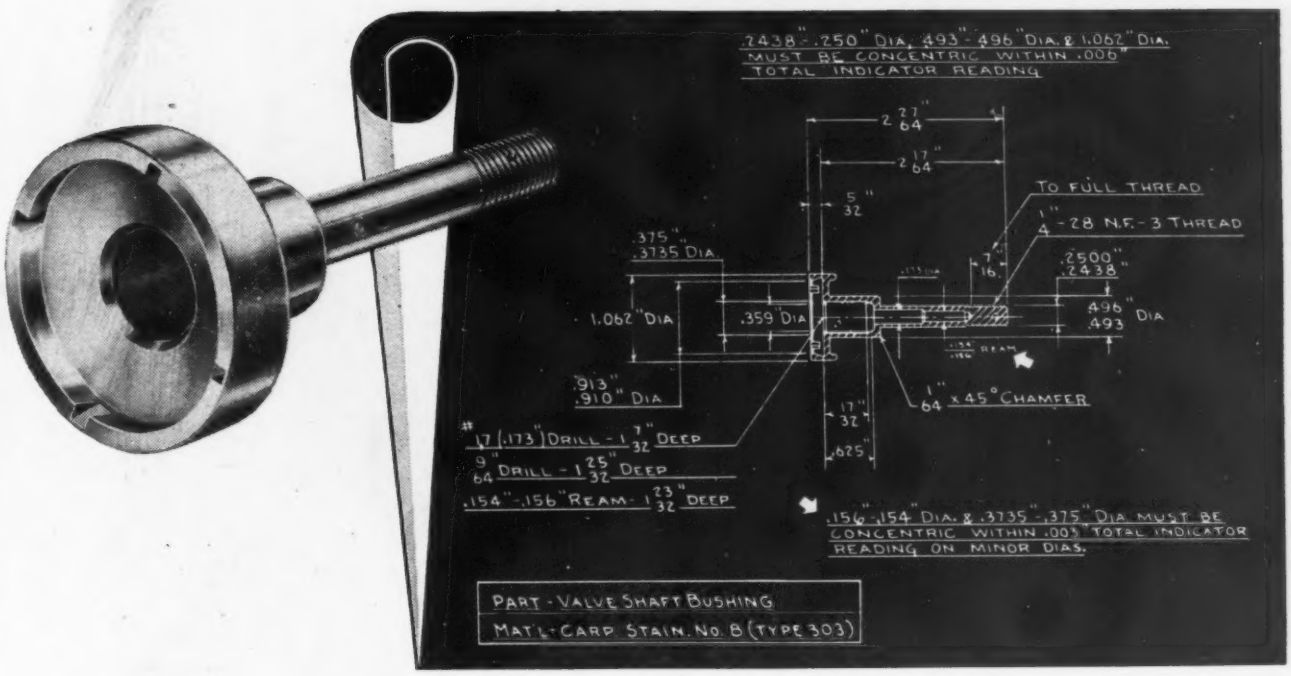

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1. First, lower costs with Stainless depend to a great extent upon the Stainless you use. Absolutely uniform Stainless bars are the only kind that will really flow through your machines, keep you free from costly tooling troubles. And *uniformity* is just what you get with Carpenter Free-Machining Stainless—bar after bar, lot after lot. So specify Carpenter on every order for Free-Machining Stainless bars.

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Washington . . .

EUGENE J. HARDY

• Joint committee schedules hearings on nation's economic health . . . Business survey hints at lower output, higher wage rates for last half of 1947.

WASHINGTON—Winding up its study and analysis of a business survey made on behalf of the group by Dun & Bradstreet, the Joint Economic Committee of Congress is ready to plunge into full-scale hearings concerning the economic state of the Union. The hearings open on June 23.

The survey was based on a 60 pct return on a mailing of 1000 questionnaires sent out to persons representing both producers and consumers, including manufacturing, merchandising and service industries as well as to labor leaders, economists, farmers, etc. Steel mills, automobile and aircraft manufacturers, chemical works, aluminum producers, locomotive works, mining companies and others concerned with the metalworking trades were prominent among the respondents.

The general opinion, according to the summary of the Dun & Bradstreet report, was that production and sales volume will begin a downward march during the last half of 1947 while wages will strive to push upward. It is also anticipated that efforts to obtain higher man-hour productivity will begin to show results.

Although this is taken to indicate that a majority of those who filled out the questionnaire anticipated a mild recession in business this fall, the committee could not see in the answers and voluntary comments any real support to talk of a depression in the near future.

"One of the striking features of the survey," said Senator Taft, committee chairman, "is that most of those contacted are more encouraged at the prospects for their own business than for their own industries. Also, they are more optimistic about their own industries than for others."

This comment was based on the fact that while 60 pct of the manufacturers of producer goods replying predicted an increase in the volume (dollar) of net sales for their own businesses, only 52 pct were similarly optimistic industry-wise. Also, among producers of consumer goods, 61 pct anticipated an increase in their own business as compared with 57 pct for their own industry and 40 pct for industry generally.

A MAJORITY of those contributing to the data for the report believe that the last half of the year will see a higher output per man but at a higher cost per unit. Belief also prevailed that there is certain to be some increase in unemployment, a slight decrease in the work-week, an increase in inventories, more plant capacity—and less profit.

Oddly enough, most of those responding expected the latter half of 1947 to be better for their own business than the corresponding period in 1946 in the fields of employment, production and dollar volume of sales.

It is expected that at the hearings the committee will pay close attention to this phase of the report, in view of an off-the-record statement of a member that such statements bolster the belief that talk of a recession in the near future is not founded on deep-seated conviction.

Another interesting point was that a lower percentage of labor representatives replied than for any other single grouping. Those who did respond, however, took a more gloomy and opposite viewpoint to business in the overall outlook; they were more pessimistic concerning the future prospects for their own workers than for unions in general.

THE steel industry was used as a case in point. It was emphasized that while there is little unemployment in this particular industry at the moment, workers in other industries are suffering from the inability of the steel mills to meet current requirements and thus maintain full employment in other fields. One labor representative commented:

"Production is being curtailed and workers laid off because of the lack of sheet steel available for the automobile and other industries using sheet steel. These lay-offs which are occurring will result in unemployment increases during the latter half of 1947. Whether these workers will be absorbed later depends upon a low price structure, high wages, and a lower margin of profit than existed in 1946 and early 1947."

A great deal of speculation centers on this statement—whether it may be a smoke signal heralding a new round of strikes for additional wage hikes. On the other hand, most labor representatives replying admitted that they expected employment, work-week, and sales to be reduced within their own industries.

In view of this fact, another explanation has been advanced to the effect that the statement may be a hint that instead of a concerted drive for more wages, labor plans to offer a united front against wage reductions as sales volume recedes—demanding that the revenue loss be absorbed by profits which both labor and some economists hold are presently too high.

ONE definite pattern emerged. Both business in general and labor seemed to agree that if reduction in force should become necessary, a combination method of lay-offs and reduction in hours should be used. Labor representatives said they would expect such a procedure and most manufacturing groups stated they would apply this method, whereas a large number within the trade, service and

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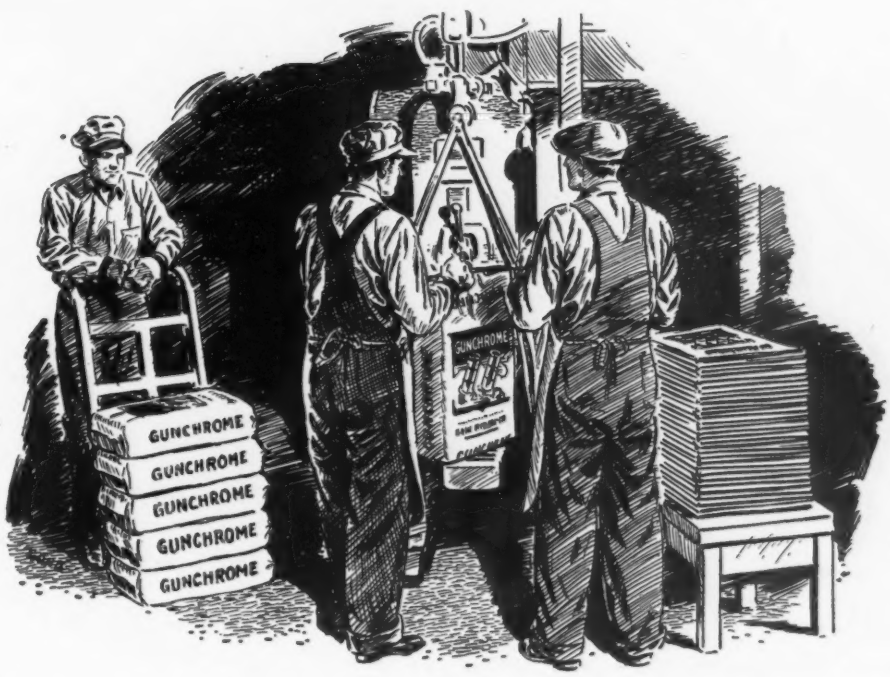
THAT'S what one open hearth man said the other day when he saw a Gunchrome demonstration.

Gunchrome is our new chrome-base, chemically bonded maintenance refractory, designed for emplacement by means of an air stream. It is finding numerous uses in the open hearth. One of the most popular is for repairing the backwall along the skewback, and for maintaining other spots in the furnace which are difficult to reach with a shovel.

The new B.R.I. Gun was developed especially to apply Gunchrome and our original basic gun refractory, Gunmix, to vertical and semi-vertical wall structures. The gun emplaces these refractories, properly wetted at the point of discharge, at the rate of more than 100 pounds per minute.

The Basic Engineer who serves your company will be glad to arrange a demonstration of Gunchrome, Gunmix and the B.R.I. Gun at your plant.



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professional groups and farmers said they would curtail operations largely by lay-offs.

There was also general agreement among all groups that the most serious obstacle at present to continued high employment levels is continuing high cost construction. A deep resentment toward government controls of business was evidenced in the comments concerning federal aid for housing. While economists and labor generally expressed a belief that the solution to the housing shortage lies in continued control and that its exercise is necessary to maintain full employment, most groups felt that private enterprise could do much better on its own—that without federal control builders could force producers to shake the water out of unreasonably priced materials.

The second most generally mentioned obstacle to reconversion to normalcy and full employment was high food prices. Very little backing was put forth by any group (except farmers) for indefinite maintenance of federal subsidization of farm production. Even among the farmers, despite the fact that farm organizations maintain strong lobbies in Washington —and which bid fair to succeed in forcing further extension of price supports for several commodities—less than half the farmers replying, 48 pct, to be exact, felt that the price support program should be continued.

THREE basic reasons were indicated for this farmer attitude —the normal American resentment against government controls, the creation of surpluses under artificially high prices which the farmer, as a rule, doesn't want, and the inflated farm real estate prices and their resultant speculation which works a hardship on the dirt farmer who desires to expand.

Farmers were found to be at odds with all other groups on the matter of personal income taxes. Some 55 pct of this class believed the current rates should be let stand for the present. All others approved proposed reductions although a substantial minority of the economists thought the rates are all right for the present.

As to the corporate taxes, the replies ran about two to one in favor of relief for business although labor and the economists were preponderantly in favor of continuing heavy levies on industry. Those in favor of tax reduction were caustically critical of double taxation now attached to corporate income.

Labor, fearful of cutbacks in employment, was strongly in favor of restoring budget cuts inflicted on the Administration's federal public works program. Labor spokesmen, commenting on the subject, were at variance with all other groups including most farmers who — with some exceptions for irrigation and similar projects—felt that all possible public works programs should be merely planned but not placed into effect until bad times definitely threaten or at least have advanced to a stage more than just rumor.

Finally, remembering the old NRA days, majorities in most of the groups were strongly opposed to consideration of legislation which would permit governmentally sanctioned voluntary price agreements on an industry-wide basis. Mining and extractive industries, however, were about evenly divided in opinion, those leaning toward such an idea being swayed by the belief that it might increase stability over the next 2 or 3 years. The opposition felt that such agreements would discourage individual price adjustments.

It has been made clear by the Committee that it doesn't consider this report as anything other than a sampling of public opinion to help chart the course of the hearing. Whether it is truly representative of public thinking is expected to be brought out in the hearings which begin next week.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Dow Buys Magnesium Plants

Washington

• • • **Dow Chemical Co.** has purchased for $3,300,000 two surplus magnesium facilities in Ludington, Mich., one operated during the war by the company and the other by the subsidiary, Dow Magnesium Corp.

WAA said that one of the properties consists of a 712-acre land tract, 19 main buildings and 34 miscellaneous small structures, such as pump houses, guard towers, derrick houses and standby heating plant. Dock frontage on Pere Marquette Lake is 2527 ft. The second property, covering a tract of about 25 acres, consists of five brine wells, only two of which are active.

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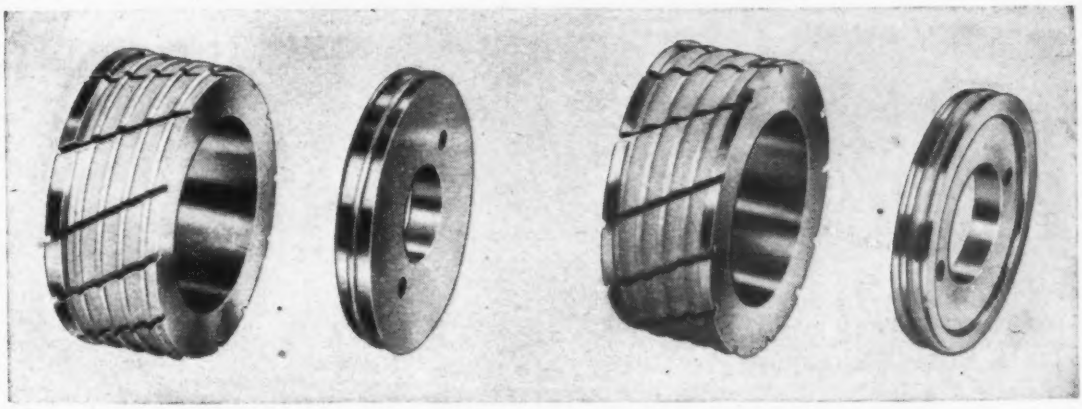


From left to right – (1) Crusher roll for truing the grinding wheel used to produce the internal die; (2) The resultant internal die; (3) Crusher roll for external die; (4) The external die.

The inner and outer rolls or dies used to roll the thread on jar lids have heretofore been made by chasing on a lathe with a tool formed to the desired thread profile. The rolls are then heat treated and polished. Distortion of form occuring in heat treating is a common cause for rejects.

This problem has been eliminated, production time greatly reduced and uniformity of quality assured by the following methods:

(1) Crusher rolls to desired thread profile are made on standard H.S.S. blanks with the Sheffield Micro-Form Grinder.

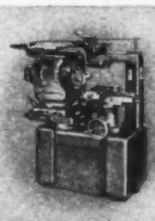
(2) The resultant crusher roll is used to dress a 120 grit wheel on the Sheffield Precision Thread and Form Grinder

(3) This Sheffield Precision Thread and Form Grinder is then set up to grind the dies in quantity with two passes of the grinding wheel over the work.

While it was possible to produce the form in a single pass at reduced work speed, the most desirable combination of production time and product finish was obtained by taking two passes, one for rough grinding and one for finish grinding.

In grinding, two parts were placed on an arbor. Total grinding time per part was slightly under 4 minutes. Approximately an hour's labor per die is saved by using crush grinding on Sheffield equipment, and the die so produced is more uniform in quality and the finish is better.

Thousands of other production cost problems can be answered satisfactorily by crush grinding with Sheffield equipment. Write for Bulletins M-100-145 and M-120-144.



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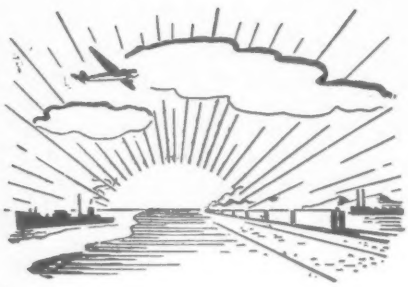
• David and Goliath contesting for Utah coal fields . . . Boeing launches big brother of B-29 . . . Atomic energy for industry is on its way.



SALT LAKE CITY—David and Goliath of the steel industry are staging a return engagement on the banks of the Potomac.

Kaiser Co., Inc., and the U. S. Steel Corp. through its subsidiary, the Geneva Steel Co. in Utah, are both seeking leases on federal coal lands.

When Defense Plant Corp. was operating the Geneva plant it filed on 2900 acres of coal lands. When the U. S. Steel Corp. purchased the plant and organized Geneva Steel Co. to operate Utah properties, most of this land had to be relinquished because the law limited any one company to 2560 acres of federal coal land. Inasmuch as Columbia Steel Co., another Corp. subsidiary, had a lease on 1500 acres, the Geneva Co. had to reduce its lease-hold sufficiently to bring the total within the permissible acreage.

In February Rep. William A. Dawson (R, Utah) introduced a bill to increase maximum acreage by four times. The Interior Dept. recommended that the existing limit be doubled and the bill was changed accordingly. But before the committee reported the bill out, Mr. Kaiser intervened, complaining that the Interior Dept. had failed to approve his applications for coal land leases and asking that the bill be held up.

The Kaiser filings are on some of the lands relinquished by Geneva and which are needed for expansion of the Geneva coal mine, according to its operators.

The Interior Dept. pointed out that the law requires competitive bidding and that the Kaiser applications could not be approved until other interested parties have been given an opportunity to submit offers. Thus, if the Dawson bill is passed, Geneva will be able to bid against Kaiser on the lands at issue, but if the bill is defeated Geneva might find itself in a squeeze for coal.

Even with the reductions in coal demands as reported in THE IRON AGE of June 12, Geneva still requires additional sources to insure long-time, full-scale operation.

In a recent report made by Kenneth Powell, superintendent of raw materials for Kaiser Co., it was stated that a total of 43,000 tons of coal are consumed per month and that 39,000 tons of high volatile coal is coming from Utah mines at Sunnyside and that 4000 tons of low volatile coal is being brought in from independent coal mines in the McAllister field in Oklahoma.

Kaiser Co. has leased a portion of the Utah Fuel Co.'s coal property at Sunnyside and these mines were opened up and equipped for production in the fall of 1942. Up to Jan. 1, 1947, 1,816,000 tons of coal had been produced from this area at a cost equal to and possibly lower than any in that state, according to Mr. Powell. He further states in his report that coal reserves sufficient to supply Fontana for a long period remain in the lease.

Applications are on file by the Kaiser Co. for an extensive program of field exploration in the Sunnyside area.

It is interesting to note from Mr. Powell's report that Kaiser Co. apparently has its coal-to-iron production ratio down to an even lower figure than that given recently C. L. Waggoner, general plant superintendent for the Geneva Steel Co. Assuming reasonably full production which has been maintained at the Kaiser blast furnace for sometime of 1200 tons of iron per day and a monthly coal consumption of 43,000 tons of coal, it is deduced that they are using approximately 2400 lb of coal per ton of iron. The Geneva figure has been given as 2900 lb of coal per net ton of iron.

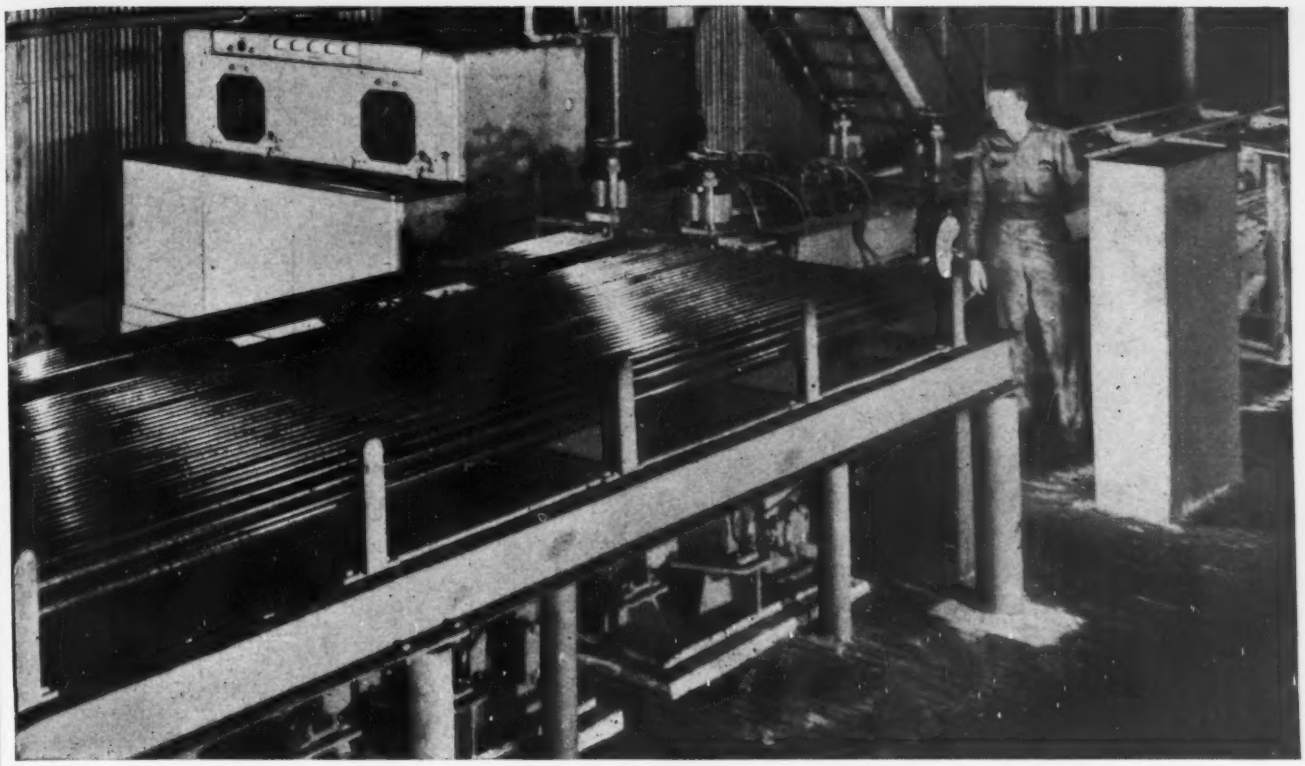
OPERATIONS at the Vulcan iron ore mine of the Kaiser Co. in San Bernardino County, Calif., are scheduled to close down July 1 as it is believed that by that time an ample stockpile of ore will have been assembled to carry operations through the remainder of this year and into 1948 when the Eagle Mountain mine is scheduled to be opened up. All mining equipment for use at Eagle Mountain will be transferred from the Vulcan mine after reconditioning. It is anticipated that the equipment at Eagle Mountain will include two 9-in. gasoline powered churn drills for primary drilling; 12 wagon drills and jack hammers for secondary drilling; three 2½-yd diesel powered shovels; and eleven 15-ton pit trucks. Complete electrification of the pit operation is planned for the future.

Explorations at Eagle Mountain indicate a reserve of 25 million net tons of iron ore of blast furnace grade which, according to Mr. Powell, will supply peak blast furnace operations at Fontana for 40 years. In addition, the U. S. Bureau of Mines estimates a potential reserve of 45 million net tons in the deposit which would be recoverable by beneficiation.

The 51-mile long railroad between Eagle Mountain and the Southern Pacific main line is now under construction by J. F. Shea Co., Inc., of Los Angeles and is expected to be completed in April 1948 when the mine is scheduled for production. Two 1200 hp diesel electric locomotives operating in tandem will furnish the power for making the two round trips per day for the movement of 3500 tons of ore.

* * *

Announcement by Standard Oil Co. of California to the effect that



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J & L is now TOCCO hardening cold-finished round bars in lengths of 10 ft. to 24 ft., in diameters of ½", ¾", ⅞", 1", 1⅛", 1 3/16" and 1 7/16"; will process 2" bars soon; and expects also to treat flat and hex stock.

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they are planning to spend $5 million to construct a 10-in. pipeline from Rangely, Colo., oil fields to Salt Lake City apparently eliminates a previously rumored project of the Utah Oil Refining Co. for a similar line.

As near as can be determined at the present time, the 181-mile pipeline will have a capacity of approximately 25,000 bbl of crude oil a day which will be brought to the Salt Lake vicinity for refining, probably in the facilities of the Utah Oil Refining Co. It seems improbable that a new refinery will be constructed by Standard, although R. G. Follis, president of the company, was indefinite on this phase. A unique feature of the proposed line is that it will have to attain a maximum elevation of approximately 9480 ft.

Best available information indicates that rights of way are still unacquired and that construction cannot be started before next spring with completion scheduled for possibly late in the summer of 1948.

The Rangely, Colo., field is considered to be a large and steady producer and should materially relieve the impending fuel oil and gasoline shortage.

SEATTLE—At long last the first of Boeing Aircraft Co.'s new B-50 super bombers has left the local assembly line and was due for test flying early this week.

Whether this new bomber, successor to the fambed B-29 super fortress, will become the Air Forces' new standard long-range bomber, or whether the giant craft developed and recently test flown for the army by Consolidated-Vultee of San Diego will be the favorite is yet to be determined.

The B-50 embodies many changes from the B-29 which include a 59 pct increase in power through four 3500 hp Pratt & Whitney Wasp Major engines which will enable the craft to cruise at speeds considerably in excess of any present bomber equipped with piston type engines, according to the manufacturers.

Aerodynamic improvements in the B-50 include a wing which is 16 pct stronger and 26 pct more efficient than its predecessor.

Final assembly work and the major portion of fabrication on the new ship is taking place here although the tail surfaces and outboard wings are being built at the Wichita, Kan., division of Boeing.

The major part ofthe weight reduction was achieved through the use of the aluminum alloy 75ST. According to Boeing engineers, this metal is so much stronger than the 24ST metal that if they had used the new alloy in the old gage they should have increased the strength of their wing in some areas by as much as 40 pct. This was precluded, however, by the need of saving weight and the fact that a 40 pct increase in strength in the already rugged plane was unnecessary.

The Aeronautical Mechanics Union at Boeing was last week still without sanction to strike although it has been more than three weeks since application was made for the permit from the national.

Local steel producers and foundries are awaiting progress of the most recent organization formed to speed up the release of obsolete war material for scrap iron and steel. Acting chairman of the newly created Steel Foundry and Scrap Industries Committee for Expediting of Iron and Steel Scrap is E. R. Hinton, vice-president of Olympic Steel Works and other members are L. G. Knight, Bethlehem Pacific Coast Steel Corp.; Francis G. Frink, Washington Iron Works; Max Sidell, Seattle Iron & Metal Co.; and Orrin C. Bradeen, regional director of the WAA.

Members of the committee termed the present scrap situation as serious as that which existed shortly after the start of World War II and insist that the scrap that is available is of poor grade.

SAN FRANCISCO—Steel fabricators on the Coast have been busy the past few weeks answering inquiries from the Dept. of Justice about just how much work they have been doing—presumably as a part of its preparation of its case to prevent the sale of Consolidated Steel Corp. of Los Angeles to Columbia Steel Corp.

Inquiries received by THE IRON AGE from these fabricators indicate that this publication has been used freely as the source for facts on jobs awarded to western fabricators. Where these figures fit into the Department's case is a matter of conjecture, but it seems logical to suppose they will be used either to prove that operation of Consolidated by Columbia would constitute a monopoly or else left out of the case if they show that Consolidated's participation in the fabrication business is small enough not to constitute a threat to other fabricators if controlled by Columbia.

Although the hearing is scheduled for this week in Wilmington, Del., which will result in the final ruling, most local industrialists refuse to believe that Attorney General Tom Clark can prevent the purchase on the grounds that a monopoly would result and are quite sure that if that does happen Columbia will start construction of its own fabricating plant within a few months.

* * *

Probably atomic energy won't be reducing ores or firing open hearths for some years to come, but John L. Lewis, or his successor, may have something to lose sleep over in 10 years or so if General Electric Co. gets results from its pilot nuclear fission plant at Schenectady, N. Y.

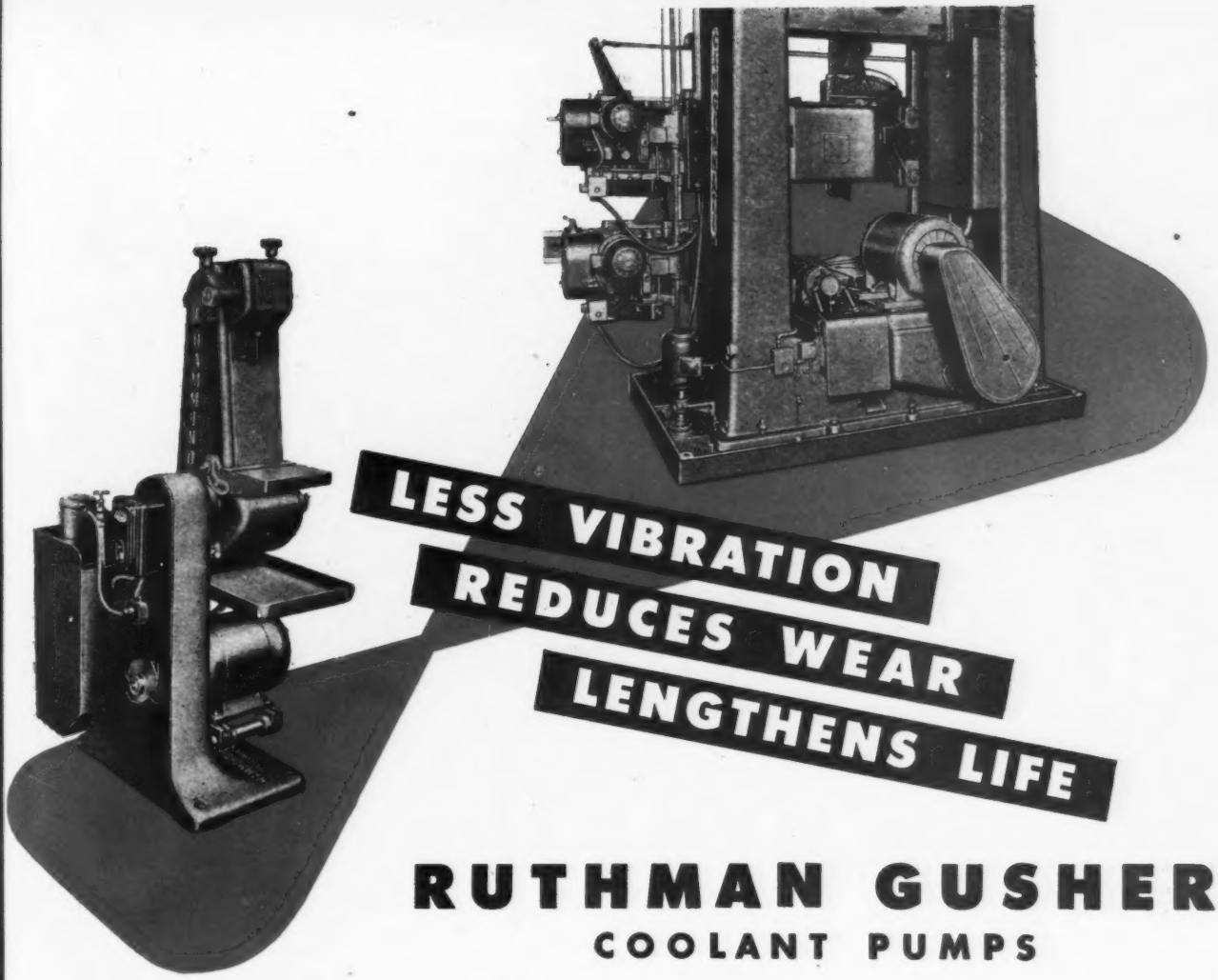
Bruce R. Prentice, staff assistant to Harry A. Winne, GE's vice-president working on the Nucleonics Project, told THE IRON AGE that atomic energy will most certainly be a big factor in our industrial economy within 10 to 20 years, and that 1 lb of uranium would produce energy equivalent to that from the burning of 3 million lb of coal.

Among the important problems still to be solved are those involving metallurgy and high temperatures, but Mr. Prentice was optimistic about their solution, and predicted that power produced in nuclear piles would eventually be cheap enough to compete with that from other fuels. He indicated that such a development would not cause an abrupt dislocation in use of other fuel.

Bendix Buys Testing Units

Washington

• • • **Bendix Aviation** Corp. has purchased for $80,000 an engine test house, an air box laboratory and a landing gear testing building of the aircraft testing plant which they operated during the war in South Bend, Ind. All are adjacent to the original Bendix plant and will be available for development of aircraft products in event of a national emergency, according to WAA.



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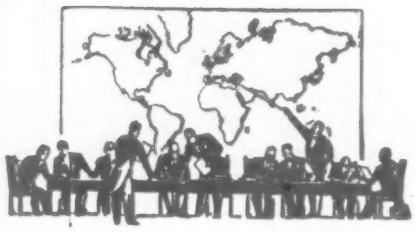
European Letter . . .

• British and American military authorities agree on coalition of their two zones in Germany . . . New German Economic Council to be responsible for certain zonal functions.



LONDON — The new agreement between the British and American military authorities for the effective fusion of their two zones is undoubtedly a marked improvement on the cumbrous, confused and self-frustrating machinery that has existed hitherto. The essence of the new plan is to place above the six states, or *Länder*, a responsible German Council which can exercise some of the more important functions of a zonal government. In this way, the process of extreme splintering in German economic and political life which was the immediate result of the joining together of the two zones has been arrested and a first step taken in the direction of effective central organs of government.

The members of the new "Economic Council" will be elected by the various *Landtage*, or state legislatures, in proportion to the populations of the states and to the party strengths at the most recent elections for the *Landtage*. The functions of the new Council appear to be virtually as wide as the normal economic powers of any central government, and their exercise is to be directed towards permissible economic reconstruction, a somewhat indeterminate phrase which was substituted at the last moment for an earlier version, which would have empowered the Economic Council to direct the economic reconstruction of the two zones on the basis of a new plan for the agreed level of industry.

The Council will have an executive agent, the executive committee, which will bear to it something of the relation of a cabinet to a parliament. The committee, however, will not be chosen from the Council, but each *Landtage* will nominate one representative to serve as a permanent member.

At the lowest level in the new hierarchy are the bizonal departments—for food and agriculture, finance, transport and so forth. In the past these departments were the only instruments of fusion and consisted of the appropriate ministers from the various state governments, together with an independent chairman.

NOW they will cease to have the character of interministerial conferences and become permanent departments on civil service lines and each will be headed by a permanent executive director, nominated by the committee and approved by the Council. The new structure is completed at each level by agencies for Anglo-American control. The Council will be subordinate to a bipartite board consisting of the military governors, the committee will be supervised by a bipartite control office and the departments by bipartite panels.

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The advantages to be derived from the new structure are obvious. A very real clarification and concentration of authority have taken place. Responsibility has now been more or less unequivocally transferred to the Germans and from the Economic Council down to the departments the chain of decision and execution is clear.

At the same time machinery has been introduced which makes it possible for the Germans to exercise a complete oversight over all the interrelated sections of their domestic economy and to evolve a consistent economic policy. It will no longer be possible, as it has been with the complete separation of the various German committees that has prevailed hitherto, for the Germans dealing with economic policy to promote a completely different policy from that proposed by the finance committee.

At the departmental level, more efficient administration should follow from the abolition of the conferences of ministers drawn from the different *Länder* and from the substitution of genuine executive departments. Since Germany has been suffering for 2 years from the lack of genuine government—quadripartite deadlock is no substitute for it—it is encouraging to see the genuine government for Western Germany.

YET it must be remembered that so far the new plans exist only on paper. Even if the machinery is better, it is still incredibly cumbrous. Each state repeats at its lower level the structure of parliament, cabinet and civil service, and this demands for the routines of administration far more Germans than can possibly be called efficient administrators.

Germany presents the paradox of a country that has at once too much and too little government — too many offices and controls and coordinating committees, too little drive and decision and oversight. Since the new machinery adds to the number of governmental agencies, serious consideration should be given to the possibility of simplifying its operation by removing Allied control from all but the highest German authority. Another danger lurks in the interpretation to be put on decentralization.

The Economic Council has, it is true, the right to impose its decisions on the states whereas the old committees had not, but the agreement lays it down that maximum use is to be made of the state governments in administering the decisions of the Economic Council and only those who have followed the relations between the old committees and the states can realize quite

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what powers of obstruction a state as isolationist as Bavaria can exercise.

Moreover, it is not certain that the new Economic Council will itself be determined to put strong pressure on the states. In the latest elections, the bourgeois parties—the Christian Democrats and the liberals—had everywhere, save in Schleswig-Holstein, a majority over the Social Democrats. The CDU, particularly in the South, is the spearhead of the movement for States' rights and *laisser faire* economics.

If the Economic Council faithfully reflects the voting, there may be an anticentralist, antiplanning majority in the Council itself. To hold that this could limit the potentialities of the new structure is not to assert any theoretical superiority of Socialism but simply to recognize the fact that the economic margins are exceptionally narrow and that priorities and allocations—in other words planning—are essential for the survival of Germany.

ANOTHER obstacle to the effective working of the new system lies in the nature of the powers conferred on the Economic Council. The aim of the merger of the two zones last year was, as is well known, "self-supporting." The two zones are to pay their way and the import-export program is clearly the central point in any scheme for the reconstruction of the zones. But it is not clear whether the Economic Council is to have any more control than had the earlier committees over this vital sector.

It is true that the Council's list of powers includes "internal and external trade," but it is apparently not suggested that the Anglo-American Import-Export Agency should be divested of its present authority. Yet if the Economic Council cannot control the flow of imports or plan its own export program, can it be said to have received adequate authority for the economic reconstruction of the zones?

It should be possible to give the Germans a general budget to work to over, say, 3 or 4 years and leave it to them to develop the practical details. Such a scheme would, incidentally, put an end to the present arrangement whereby if the Germans manage to provide more foodstuffs from the zones, their allocation from overseas is promptly cut—an obvious and direct incitement to nonproduction and nondelivery in Germany.

This difficulty over the import-export program is only one part of a much more complex problem, one which the adoption of new governmental machinery hardly touches. The question which must determine all the new agencies' hopes of success is one that they themselves cannot solve. Can the Anglo-American Zone, under any type of administration, good or bad, really be made to pay its way? Can it produce the exports? Having produced them, can it market them? If in fact self-sufficiency is an economic impossibility, no improvements to the machinery of government will have the desired result.

It must be frankly admitted that the prospects are not good. Nominally the production of exports still suffers from the disabilities imposed by the first Level of Industry plan. Under this plan, it will be recalled, a large number of German industries were restricted to a certain output. The decisive figures were the limitation of steel production to 39 pct of prewar capacity (7.5 million tons), light metals to 54 pct basic chemicals to 40, heavy engineering and heavy electrical engineering both to 31, light mechanical and electrical engineering to 50, machine tool production to 11 pct.

Yet before the war no less than 65 pct of Germany's exports were provided by these restricted industries. It has now been estimated that to secure self-sufficiency for the two zones, exports would need to be about 65 pct higher than the prewar figure, owing to the loss of Eastern German supplies, the greater cost today of imports of food and raw materials and the disappearance of Germany's external assets. Can it be supposed that this great increase can possibly be secured if the industries which produced the bulk of exports before the war not only do not expand, but are positively restricted?

IN a sense, the theoretical position under the Level of Industry plan is academic today. Neither zone has anywhere near reached the permitted levels laid down in the plan. The present flow of exports is still little more than a trickle. For instance, exports for the first quarter of 1947 which were expected to be $87 million have proved to be only $31 million. The first aim must therefore be to expand industry to the permitted levels and not to be unduly concerned about observing the restrictions.

In another sense however the question of the Level of Industry is the opposite of academic. The absurdity of the old plan is now obvious to everyone. The British and the Americans are agreed in principle on an upward revision (even Mr. Molotov agrees to this), and the figure of 10 or 11 million tons of steel has been widely quoted.

Recently there have been suggestions from Germany, demands from the Inter-Allied Reparations Agency in Brussels, and hints from the Board of Trade, suggesting that one of the purposes of a new Level of Industry Plan would be not only to increase the permitted scale of German production, but also to make a new assessment of available reparations so that, in the near future, the surplus capacity could be removed and the question of reparations from the western zones settled once and for all. If this is the case, it is certainly fortunate that the suggestion of a new Level of Industry Plan has been withdrawn.

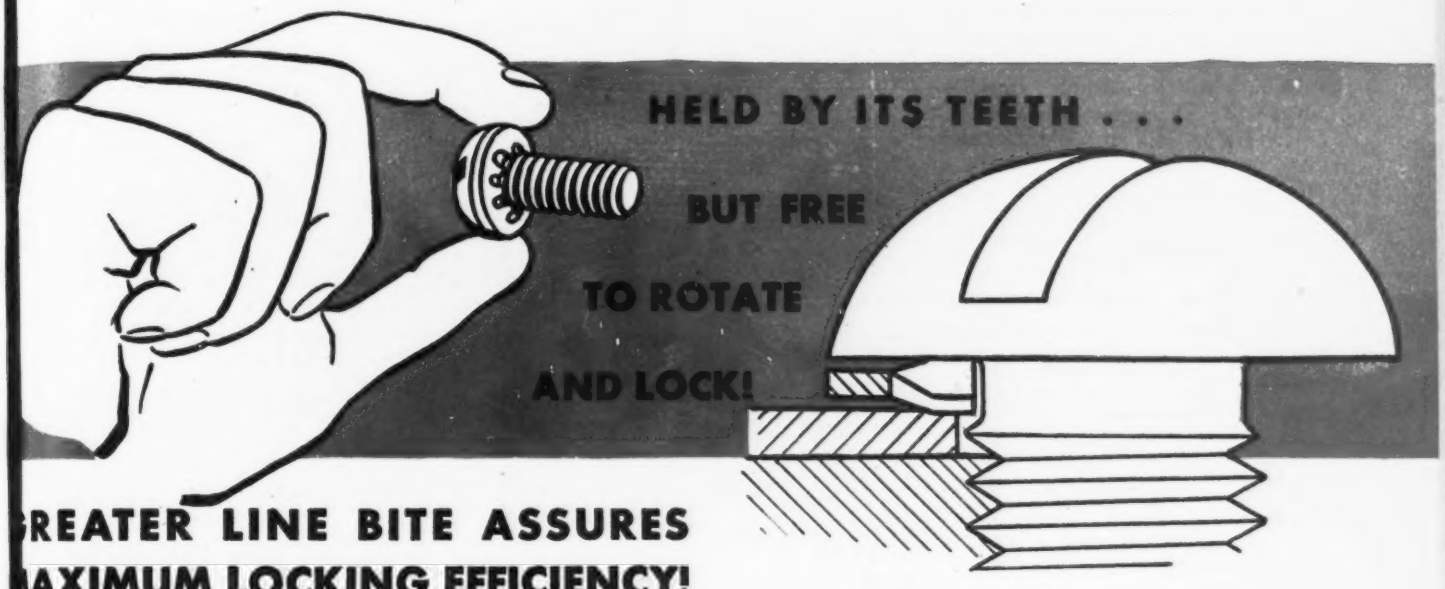
THE new constitution that the Americans and the British have given their joint zone is, beyond any doubt, a great improvement on the old. But whatever the administrative structure in Germany, it cannot iron out the basic contradiction — the fact that the zones cannot and will not pay their way.

To solve this dilemma the problem of Western Germany must be merged into the wider problem of Western Europe. Closer economic integration in the West could provide the necessary markets, while the provision of dollars on the scale required to reconstruct Western Europe in general could include an allotment for specifically German purposes.

These projects may sound visionary, but unfortunately the solution of the zonal problem on the present basis is no less so. When ruin has reached such vast proportions, plans equally vast can alone begin the task of repair.

WHERE INTERNAL LOCK WASHERS ARE REQUIRED, SPECIFY

SEMS *by* SHAKEPROOF

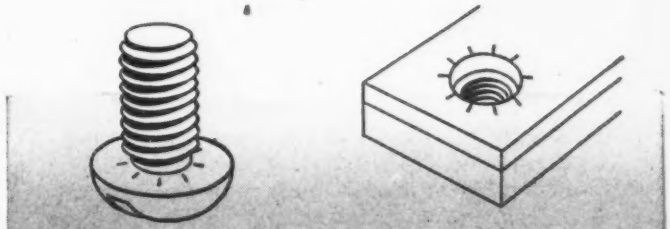


GREATER LINE BITE ASSURES MAXIMUM LOCKING EFFICIENCY!

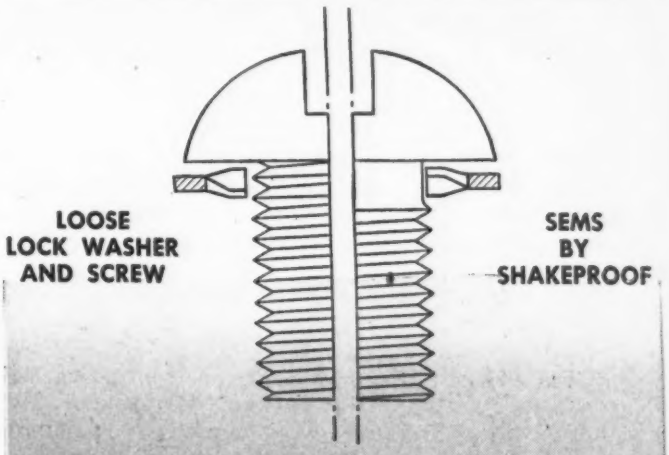
addition to the important cost savings secured with pre-assembled shers and screws and the well known features of Shakeproof lock shers, sems by Shakeproof provide other special advantages ich assure better fastening results. By making the internal diam- r of the internal type toothed washer smaller than the diameter he screw thread the lock washer is held on the screw by its teeth is free to rotate and lock. When separate washers and screws used, the washer has to have an internal diameter larger than diameter of the screw thread. This means that the teeth of the rnal type lock washer on a sems by Shakeproof are longer for same overall washer diameter and thus have greater contact h the clamping surface of the screw head and consequently reased locking power.

o, because the lock washer is held on the screw so that it is free rotate, the line-bite of each locking tooth is utilized to its full ciency. As the screw is driven home the teeth are positioned con- tric with the screw. There is no opportunity for canting or buckling thus full locking action starts at the instant of contact.

ecify this efficient, cost-saving fastener unit — write for complete gineering data on sems by Shakeproof!



These illustrations of screw and work piece show the line-bite of the lock washer teeth. The washer has been cut away from the screw to show how the bite marks closely approach the unthreaded portion of the screw shank proving greater locking contact. Also, note absence of any trace of milling action.



This combination cross section view shows a comparison between sems by Shakeproof and a washer put on a screw after the thread is rolled. Note the smaller internal diameter of the lock washer on the sems with the thread holding the lock washer on the screw by its teeth. Also, observe how maximum tooth engagement with minimum overall washer diameter is assured.

SHAKEPROOF inc.
Fastening Headquarters

Division of ILLINOIS TOOL WORKS
2501 North Keeler Avenue, Chicago 39, Illinois
Offices in Principal Cities
Plants at Chicago and Elgin, Illinois
In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario

PERSONALS

° ° °

• **K. L. Konnerth** has been appointed general manager of operations and **A. J. Breitenstein** has been named to succeed him as assistant to president in charge of engineering for H. C. Frick Coke Co., and U. S. Coal & Coke Co., Pittsburgh. Mr. Konnerth started with U. S. Fuel Co., now U. S. Coal & Coke Co., in 1923 as an electrical draftsman and in 1926 was transferred to Frick headquarters in Uniontown, Pa., as assistant electrical engineer. He became chief engineer for the company in 1941 and was named assistant to president 3 years ago. Mr. Breitenstein has been chief engineer of Frick since 1944. He started with the company 3 years earlier as assistant mining engineer and became assistant chief engineer in 1942.

• **W. N. Springer** has been appointed purchasing agent in charge of purchases of E. C. Atkins & Co., Indianapolis. He advances from assistant purchasing agent, which position he has held since 1941.

• **Henry L. Woods, Jr.** has been made assistant to the executive vice-president of American Rolling Mill Co., Middletown, Ohio. His connection with Armco began in 1926 when he entered sales training. He became manager of central sales in 1944. **Wallace B. Quail** has been named manager of central sales area. In 1919, he was a sales engineer for Standard Steel Car Co. and in 1927 was district manager in New York for the Forged Steel Wheel Div., of Columbia Steel Co. Both of these organizations became a part of Armco later. In 1930 he was appointed New York district sales manager with the Railroad Sales Div. of the company. **Robert Y. Barham** has been advanced to district manager of the New York-Boston district. He was employed as manager of railway sales by Western Metal Co. in 1926. Three years later, this organization was absorbed by Calco, now a division of Armco Drainage & Metal Products Co. At that time he was railroad sales engineer for Calco. He was advanced to the position of district manager of Ingot Iron Ry. Products Co., in 1939. After 5 years in Chicago as district manager for Armco Railroad Sales Co., he became assistant district manager in Chicago's Armco offices.

• **W. E. Mullestein** has been appointed manager of field sales, for Lukens Steel Co. and its subsidiaries, By-Products Steel Corp. and Lukenweld, Inc., Coatesville, Pa. Mr. Mullestein succeeds Arthur J. O'Leary, deceased. Mr. Mullestein has been manager of the Coatesville district sales office of Lukens, By-Products and Lukenweld since 1945.

SEWARD H. FRENCH, JR., assistant to the president, Crucible Steel Co. of America.

• **Seward H. French, Jr.,** Pittsburgh attorney, has been appointed assistant to the president of Crucible Steel Co. of America in charge of industrial relations. Since 1937, Mr. French has been associated with the Pittsburgh law firm of Reed, Smith, Shaw & McClay, general counsel to Crucible. Before his appointment to the Crucible executive post in New York, Mr. French assisted the company in legal matters relating to labor relations.

• **John T. Condon** has joined the general sales staff of Chrysler Div., Chrysler Corp., Detroit. For the last 5½ years, he has served as manager of the industrial engine division of Chrysler Corp. **John C. Hammelef** succeeds Mr. Condon as manager of the industrial engine division.

• **Harry T. Burke,** chief engineer of E. W. Bliss Co.'s Brooklyn plant, has been appointed assistant to general sales manager. Prior to his appointment as chief engineer of Bliss, Mr. Burke supervised hydraulic press engineering. He will be located at the Bliss Co.'s new general offices in Detroit.

• **Wallace B. Hunter** has been appointed senior contracting manager of the Chicago district of the American Bridge Co., U. S. Steel Corp. subsidiary. In this newly created position, Mr. Hunter will be in charge of all contracting work of the company in the Chicago district, including the contracting suboffice at Gary, Ind. He started work with American Bridge Co. in 1928 in the operating department. He will come to Chicago from Boston, where he has been contracting manager of the bridge company since 1936. Before that he was assistant contracting manager for 3 years in Baltimore.

• **C. S. Larsen** has been appointed assistant manager of the New York sales office for Wheeling Steel Corp., and **K. T. House** succeeds Mr. Larsen as Pacific Coast manager. Mr. Larsen had been with Wheeling's New York sales staff for 21 years prior to going to San Francisco in 1943. Mr. House has been the company's sales representative in the Chicago area since 1931.

• **Edwin R. Wisner** has been made manager of eastern district sales of the Baldwin Locomotive Works, Philadelphia. He takes the position vacated by **Roland C. Disney** who has been promoted to assistant general sales manager. Mr. Wisner was first employed by the Westinghouse Electric & Mfg. Corp., remaining there until the outbreak of the war. His subsequent war work was with the U. S. Maritime Commission in the production division. He resigned in 1945 and spent a year in the electric power department of Elliott Co. before joining the Baldwin Locomotive Works.

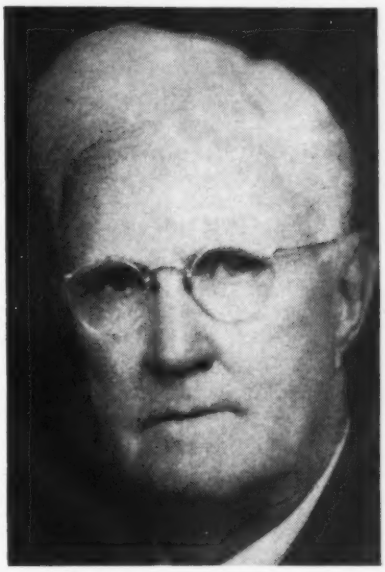
• **T. Clayton Cheney** has been appointed advertising manager of Inland Steel Container Co., Chicago. In addition to this new assignment, he will continue his present responsibilities as manager of advertising and sales promotion of the Milcor Steel Co., Milwaukee.

• **O. V. Greene,** formerly manager of tool and alloy steel sales, has been appointed assistant general sales manager of the Carpenter Steel Co., Reading, Pa. In his new post Mr. Greene will be in charge of sales promotion. **H. S. Potter,** formerly assistant manager of tool steel sales, has been promoted to manager of tool steel sales. **W. M. Loos,** formerly assistant manager of stainless steel sales, has been promoted to manager of stainless steel sales. **J. W. Thompson,** formerly assistant manager of alloy steel sales, has been promoted to manager of alloy steel sales. Other promotions are: **J. D. Nelson,** formerly sales engineer in the Chicago territory, now becomes assistant manager of tool steel sales, and **M. H. Goodman,** previously sales engineer in the New England territory, has been appointed assistant manager of stainless steel sales. **E. Von Hambach,** research and development engineer formerly located in Detroit, has now established headquarters in Reading, Pa.

• **J. I. Onarheim** has been named to the staff of the central station and marine sales department of Allis-Chalmers Mfg. Co., Milwaukee. Until recently Mr. Onarheim had been employment manager of the company for 7 years. **Warren F. Keller** has been appointed to succeed **W. C. Mander,** milling engineer, who is retiring. Mr. Keller was superintendent of the B. A. Eckhart Milling Co. before coming to Allis-Chalmers in 1945.

• **H. H. Buckley** has been appointed Pittsburgh district manager of the Hendrick Mfg. Co., Carbondale, Pa. The appointment fills the vacancy created by the recent death of Bruce G. Shotton. Prior to joining the Hendrick organization, Mr. Buckley was associated with Heyl & Patterson, Inc., Pittsburgh, in their engineering and engineering sales departments.

• **George J. Stanley,** director, vice-president and general sales manager for Aluminum Co. of America, will retire as vice-president and general sales manager on July 1. He will continue as a director of the company. Mr. Stanley has served the company for more than 42 years in both sales and engineering capacities.



VAL LEE, president, Sidney Machine Tool Co.

• **Val Lee** has been appointed president of the Sidney Machine Tool Co., Sidney, Ohio, to fill the vacancy caused by the death of F. P. Thedieck. Mr. Lee in addition to being president will continue as treasurer of the company which position he has held for the past 18 years.

• **Harold W. Catt** has been named manager of the textiles, paper products and advertising purchasing department of the B. F. Goodrich Co., Akron, Ohio, succeeding **Robert D. Franklin,** who has resigned. Mr. Catt had been manager of the chemicals and pigments purchasing department since 1944. He is succeeded in that post by **David L. Flanders.**

• **George E. Winters, Lloyd Morrow** and **Frank H. Mull** of Continental Motors Corp., Muskegon, Mich., have been advanced to the board of directors of the corporation. Mr. Winters has been named executive vice-president of the company, Mr. Morrow becomes vice-president in charge of management-labor relations at Muskegon and Mr. Mull becomes vice-president in charge of the shop control division. **H. M. Parker** and **W. G. Raven,** of Continental Aviation & Engineering Corp., have been named to the board of directors of that company. Mr. Parker is assistant secretary and assistant treasurer, and Mr. Raven has been promoted to secretary. **A. C. Dykema** has been elected financial comptroller.

• **George J. Easter** has been appointed director of research of Electro Refractories & Alloys Corp., Buffalo. Mr. Easter succeeds **Milton H. Berns** who recently assumed the new position of director of technical service. Mr. Easter was formerly associated with the Carborundum Co. in the capacity of manager of research and development.

• **Harry P. Henderson** has been appointed general supervisor of methods and plant layout for the Bristol, Conn. plant of the New Departure Div., General Motors Corp. **Ernest F. Morris and Oscar P. Liebrich** have been appointed assistants to the Bristol factory manager, A. F. Herold. **E. W. Bolduc** has been made assistant to the director of inspection, R. E. Young.

• **Archie S. Ray,** roller foreman, Brier Hill round mill, has been appointed assistant superintendent of the Brier Hill blooming and round mills, Youngstown Sheet & Tube Co., Youngstown, succeeding Melvin Shaulis, who became superintendent earlier this year. Mr. Ray joined the company 21 years ago as an operator on the old sheet bar mill at Brier Hill. **John DeHetre** has been appointed development engineer on the operating staff of Youngstown Sheet & Tube Co. He formerly was field engineer for Youngstown Steel Products Co. of California, a subsidiary company. Mr. DeHetre joined Youngstown Sheet & Tube Co. in 1938 as an assistant field engineer in California. **Arthur M. Long,** assistant general manager of sales and manager of tinplate sales, has been transferred from Youngstown to Chicago. **Myron H. Watkins,** assistant manager of tinplate sales, has been transferred from Chicago to Youngstown and becomes assistant general manager of sales.

• **Charles Ellison,** formerly with the Packard Motor Car Co., has been appointed chief electrical engineer of Hanson Equipment Co., Detroit.

• **C. M. Jacobs** has been appointed assistant purchasing agent of the Dumore Co., Racine, Wis., to succeed **Will Thomsen,** who has been transferred to the Greene Mfg. Co., a subsidiary.

GEORGE W. SWEENY, whose appointment as vice-president, U. S. Coal & Coke Co., was announced in the June 12 issue.

• **William A. Roberts** and **William C. Johnson** have been appointed executive vice-presidents, respectively, of the tractor and general machinery divisions of the Allis-Chalmers Mfg. Co., Milwaukee. **Marshal L. Noel** has been appointed vice-president and general sales manager for the tractor division, and **J. L. Singleton,** vice-president and director of sales for the general machinery division. Mr. Roberts formerly was vice-president in charge of the tractor division while Mr. Johnson was vice-president in charge of the general machinery division. Mr. Noel formerly was general sales manager of the tractor division, and Mr. Singleton was manager of the general machinery division's district sales offices.

• **H. W. Force** is retiring July 1 as president of the Calco Div. of Armco Drainage & Metal Products, Inc. of Berkeley, Calif. Mr. Force, with his father, founded the California Corrugated Culvert Co. in Berkeley in 1908, and in 1935 this company was taken over by the American Rolling Mill Co. of Middletown, Ohio, and since that time has been operated as a wholly-owned subsidiary. **C. R. Hodgkin,** vice-president of Armco Drainage & Metal Products, Inc., will be in charge of the Calco Div. Mr. Hodgkin has been with the organization for more than 35 years.

• **Dr. Lester A. Pratt** has been appointed assistant to the division general manager of the Merrimac Div. of Monsanto Chemical Co., Boston. Dr. Pratt has also been named president, general manager and trustee of the New England Alcohol Co., a Monsanto subsidiary at the Everett, Mass. plant. **Howard J. Heffernan** has been appointed division general sales manager to succeed Dr. Pratt. **Frederick S. Hatch** has been elected vice-president of the New England Alcohol Co. Dr. Pratt joined the Merrimac Chemical Co. in 1916 in charge of the research laboratory at Woburn. In 1927 he was made manager of the lacquer department and continued in that position when the company became part of Monsanto in 1929. He became division general sales manager in 1945.

• **M. J. Vollmer** assistant secretary and assistant treasurer, has been elected a director of the A. O. Smith Corp., Milwaukee, to succeed **John Leekley,** resigned. Mr. Vollmer joined the A. O. Smith organization in 1929.

• **Richard T. Spear** has been appointed regional sales manager for the line of low-temperature welding and brazing alloys and fluxes of All-State Welding Alloys Co., Inc., White Plains, N. Y. His territory includes eastern Pennsylvania, south New Jersey, Virginia, West Virginia, Delaware, Maryland, and the District of Columbia. Mr. Spear was formerly associated with the Pan-American World Airways System.

• **Dr. Stephen J. Zand** has been appointed vice-president in charge of engineering of the Lord Mfg. Co., Erie, Pa. Dr. Zand has been working with Lord's as consulting vibration engineer since 1933. In his new position he will devote his full time to the Lord company and will be responsible for all engineering, research and development activities comprising the company's product engineering and research divisions. From 1932 to 1945 Dr. Zand was employed by the Sperry Gyroscope Co. as senior project engineer and later as director of the Vose Memorial Laboratory. In 1945 he was made technical aide to the vice-president for operations of the parent organization, the Sperry Corp.

• **H. D. Foster** has been named manager of Goodyear Tire & Rubber Co.'s mechanical goods division, Akron, Ohio, succeeding the late W. C. Winings. **Sam DuPree,** sales manager of Goodyear's molded goods plant in St. Mary's, Ohio, becomes assistant manager of the mechanical goods division. Mr. Foster has been associated with Goodyear 33 years, and has been eastern sales manager of the mechanical goods division since 1941.

OBITUARY...

• **Edwin R. Motch,** 72, chairman of the board, Motch & Merryweather Machinery Co., Cleveland, died June 7. He was one of the organizers of Motch & Merryweather in 1904, and was president of the company from 1930 until last year when he was elected chairman of the board.

• **Paul R. Beardsley,** 77, treasurer and one of the founders of the Sealed Power Corp., Muskegon, Mich., died May 31.

• **John A. St. Clair,** 64, sales engineer for E. C. Atkins & Co., Indianapolis, died May 15.

• **Clifford D. Dawson,** 64, died recently. Former industrial relations manager for the Hudson Motor Car Co., Mr. Dawson retired in 1930.

• **Ralph J. Richards,** 65, office manager of Van Huffel Tube Corp., Warren, Ohio, for 22 years, died May 31.

• **Chester A. Kellogg,** chief of metallurgy and inspection, Continental Steel Corp., Kokomo, Ind., died June 2.

• **John W. Hubbard,** chairman of the board of Hubbard & Co., Pittsburgh, died June 3.

• **Henry B. Mueller,** 57, president and treasurer of the Spring City Pattern Works, Waukesha, Wis., died recently.

• **Albert C. Wischmeyer,** 61, president and treasurer of the Nunn Brass Works and treasurer of the K. Barthelmes Mfg. Co., Inc., both of Rochester, N. Y., died May 30.

Dear Editor:

SWAGING

Sir:

Will you please advise me to whom I may write to secure information on swaging a small diameter piece of 1/16 in. diam and about 1 13/16 in. long. On one end two diameters are to be swaged, one to be 0.040 in. and the other to be 0.029 in. The other end has only one diameter, 0.040 in. You ask—"Why swaging?" I wonder that, too. I asked a company if a screw machine would be satisfactory, and they told me—"too slow." The material is to be of a steel similar to the free-turning screw-machine stock.

CHARLES W. FISHER
Rohrerstown, Pa.

● It would seem that unless you use a B. & S. No. O screw machine that swaging would be the fastest means of turning out the job in question. However, send your problem to the manufacturers whose names we are sending to you.—Ed.

DOW TIME ESTIMATOR?

Sir:

Any information you can give us as to where we may obtain a "Dow time estimator" would be appreciated.

ROBERT A. LESTER
Lester & Co.
Newark, N. J.

● Can any of our readers identify the "Dow time estimator" and provide the information as to where Mr. Lester can get one?—Ed.

DIRECTORY OF TOOL STEELS

Sir:

I wish to obtain two copies of the "Directory of Tool Steels." Would you inform me if you can supply this literature.

A. G. ALMACK
Sales Representative
Jessop Steel Co. Ltd.
Toronto

● The 19th revised edition of the directory is now available to subscribers at $2.00 each for one or two copies; $4.50 for three copies; and $1.00 each for six or more copies.—Ed.

INDEXING DEVICE

Sir:

We are interested in purchasing a quick indexing device which would be used on a hand milling machine for indexing up to 12 divisions of the circle. The device should be equipped with centers and arranged for a 3-jaw chuck with a 1½-in. clearance hole. The hole should extend through the body to accommodate long shafts. The centers should swing 6-in. diam work and the chuck should have a 4-in. capacity. The indexing mechanism that we have in mind should be of the rapid type involving a plunger which fits into notches on the indexing plate rather than a worm and gear drive. If possible, we would like to use this device in either the vertical or horizontal position. Kindly advise if you know of a manufacturer of the foregoing equipment.

W. C. EBERHARDT
Research Engineer
Gould & Eberhardt
Irvington, N. J.

● We are forwarding names of firms specializing in indexing devices. However, you may find it necessary to have the device specially made to your requirements.—Ed.

FREE ENTERPRISE?

Sir:

Is this a free enterprise system? All right. Then what right have we to give Henry J. Kaiser $85,000,000 of future unearned workers wages (Government check book money) to engage in competition with other steel companies and their stockholders?

OSCAR STANKEY
1104 North 9th St.
East St. Louis, Ill.

FEEDING CASTINGS

Sir:

We are interested in obtaining copies of two articles, "High-Pressure Feeding of Static Molds" appearing in the Jan. 10 and 17, 1946 issues, and "A New Feeding Technique for Castings" in the Apr. 25, 1946 issue.

W. W. BRENNEMAN
Metallurgist
Ohio Steel Foundry Co.
Lima, Ohio

CONTROLLED CONVERTER BLOW

Sir:

We would appreciate your sending us tear sheets of the article entitled "Spectrographic Control of the Converter Blow" from the May 29 issue, pp. 50 to 57.

A. KIPP
Philips Laboratories, Inc.
Irvington on Hudson, N. Y.

PHILIPPINE SCRAP

Sir:

With regard to the aftermath of war, there is at present upwards of 700,000 tons of scrap metal in the Philippine Islands. Many investigating committees have been in the Philippines to ascertain the possibility of returning this scrap to the U. S., but the cost of shipment has been prohibitive. The Philippine Government would like to know the possibility of erecting a mill in the islands to manufacture sheet and corrugated metal (which is in great demand in reconstruction) thus utilizing the available scrap and eliminate the necessity of shipping it to the U. S. as scrap and returned as sheet metal. Knowing that your magazine covers steel manufacture and being familiar with the sources of machinery for a project of this kind, any assistance in furnishing names of manufacturers would be appreciated.

ALEXANDER M. BROWN
Special Agent
Philippine Shipping Commission
Washington

● We are forwarding a list of designers and builders of steelmaking and rolling facilities capable of supplying necessary equipment.—Ed.

IMPROVED DIE LUBRICANT

Sir:

We would like to obtain tear sheets covering the article, "Forging Costs Cut by Improved Die Lubricant," by Lambert R. Pistoles, which appeared in the Oct. 17, 1946, issue, p. 55.

J. H. SIPCHEN
J. H. Sipchen Co.
Chicago

THESE TYPOGRAPHICAL ERRORS!

Sir:

In the May 29 issue in Newsfront there is an article which reads "Vertical furnaces are gaining in popularity, the newest being a strip annealing unit which uses associated ammonia atmosphere." Shouldn't the word *associated* be *dissociated?*

C. H. HANNON
Metallurgist
Pittsfield Works' Laboratory
General Electric Co.
Pittsfield, Mass.

● You are right, of course. The word is "dissociated."—Ed.

INVOLUTE SPLINE

Sir:

I am very much interested in an article and the tables contained therein on involute splines. Will you please mail me the article from the Apr. 3 issue?

ROBERT S. SUTHERLAND
Inspection Dept.
Farm Implement Div.
International Harvester Co.
Chicago

● Tear sheets of the article, "Engineering Aspects of the Involute Spline," are being mailed to you.—Ed.

LABORATORY INSTRUMENTS

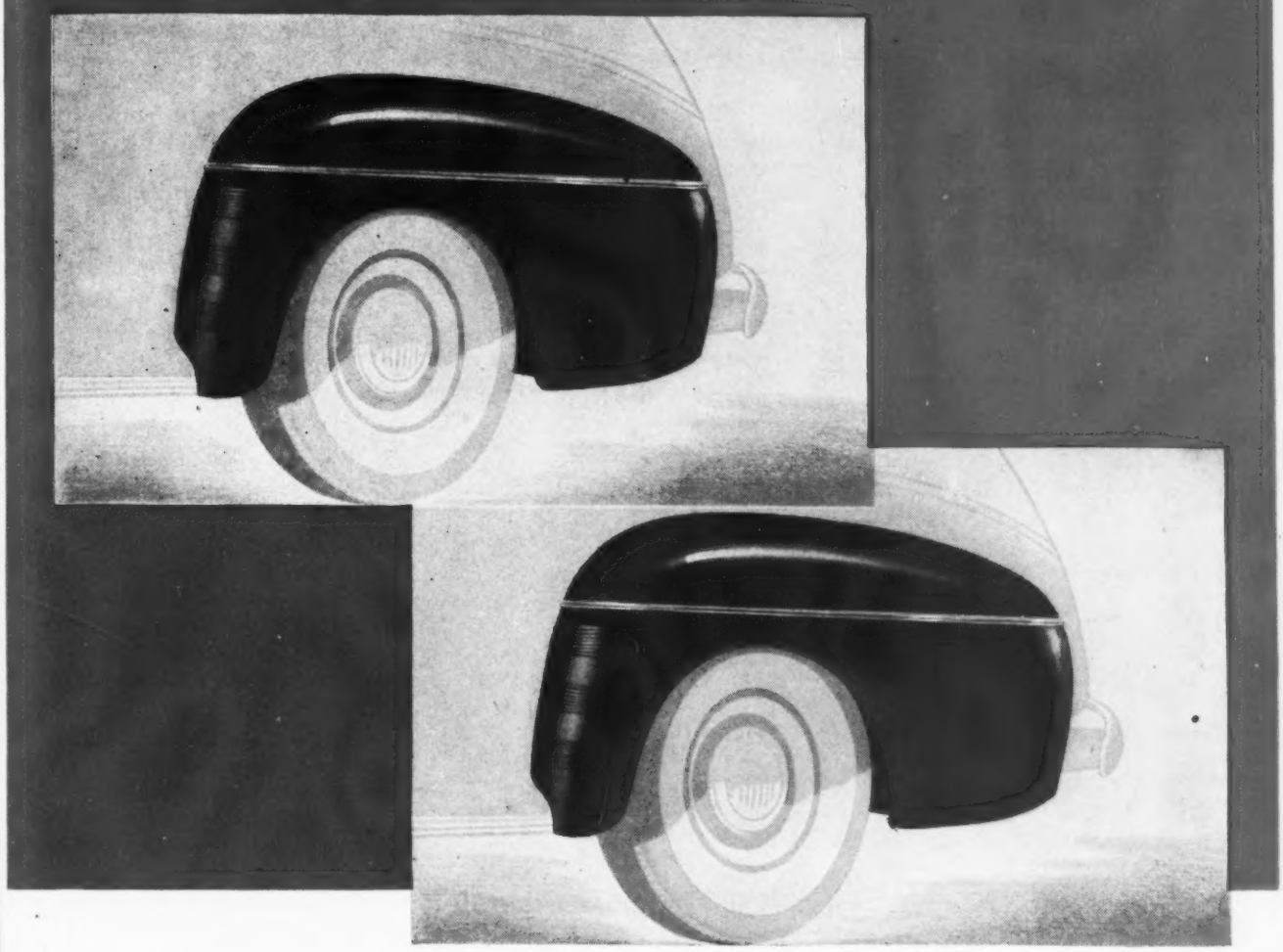
Sir:

We would like to reproduce by offset the four-page article entitled "Basic Characteristics of Useful Industrial Laboratory Instruments" which appears in the May 1 issue, pp. 58 to 61. These reproductions would be sent to our field representatives to familiarize them with the principles and basic arrangements of various laboratory instruments. We would appreciate your permission to reproduce this article for the purpose indicated, with credit to your publication.

D. W. COUTLEE
Director of Advertising
Merck & Co., Inc.
New York

● We are happy to grant permission to reproduce the pictographic chart.—Ed.

Sure, they LOOK ALIKE from where you sit



. . . but what a difference under the paint!

One of those gleaming new fenders is regular low-carbon steel; the other is N-A-X HIGH-TENSILE.

Because of the high yield strength of N-A-X HIGH-TENSILE, fenders and similar parts made of this steel will be considerably more resistant to denting. This characteristic, combined with other desirable properties of N-A-X HIGH-TENSILE, assures longer life with less maintenance cost.

N-A-X HIGH-TENSILE's finer grain structure and higher hardness make possible a better finish without costly surface preparation.

N-A-X HIGH-TENSILE's higher corrosion (rust) resistance means that the fender will keep its new-car look and style much longer.

From any angle you look at it — manufacturer's, fabricator's, owner's—the N-A-X HIGH-TENSILE fender is far and away the better buy!

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

Industrial News Summary...

- **Steel Demand Remains Strong**
- **Scrap Market Firms Up Again**
- **Steel Rate Stays at 96.5 Pct**

THE expected decline in steel activity is months away. No substantial drop in steel ingot output because of the demand factor is expected to take place much before the first quarter of 1948, if then. This strong surge in steel buying which has been maintained for months on end has confounded some observers who had expected a definite easing in steel products by July 1.

Some minor soft spots have developed in recent weeks but these are offset by the overall strong requirements from other steel consuming customers. A quick survey indicates that major steel companies are only placing orders on their books which they know can be completed within the steel mill production schedules. Were all bars to be let down, incoming steel order volume would be far greater than at the present time.

Large consumers such as automotive companies, while maintaining tremendous stocks of steel, continue to find these inventories unbalanced with the result that no full use of these stocks can be had until the hard-to-get items have been built up. Industrial construction has picked up recently with some jobs going forward which had previously been postponed. Demand from oil, water and gas companies is at an unprecedented high with small chance of pipe requirements being completely met for at least the next 2 years.

STEMMING partly from the anticipation of the coal strike and a failure of general steel demand to show any definite signs of falling off, strength in the scrap market this week extended to additional areas. In one of the largest rises since the downward trend in scrap prices was stopped a month ago, THE IRON AGE scrap composite price this week reached $33.25 a gross ton, up $1.25 a ton from last week's figure of $32. The index is now $3.75 a ton above the $29.50 low for the year to date, reached on May 20, and $6.42 a ton below the high of $39.67 reached on Mar. 18.

Increases in No. 1 heavy melting steel this week amounted to $4 a ton in New York and Birmingham; $2 a ton at Pittsburgh; $1.75 at Philadelphia; $1 at Boston and $1 at St. Louis. These increases occurred despite the absence from the market of several large steel mill consumers. Should the latter come into the market in the near future while the threat of a coal strike is still on a further upward movement is anticipated. This is borne out by the sharp rise in the price of railroad heavy melting scrap which this week advanced $5.50 a ton from the last quotation at Cleveland. This particular situation caused some consternation in scrap consuming circles and quiet pressure is expected to be placed on the railroads to keep them from selling at the higher quotations. Whether it will be successful remains to be seen.

New freight rate increases to go into effect this week are expected to cause some distortion in the already unbalanced distribution picture. The necessity for paying higher freight costs will drive many customers to exert extreme pressure on nearby mills for deliveries while on the other hand steel mills which have been competing in other areas by means of freight absorption may find it necessary to withdraw from those areas. Some companies report that trucking costs will be much lower than freight costs. Expansion in truck movements of steel between such points as Pittsburgh and Philadelphia are expected. Many steel companies this week had no definite information on the full effect of the freight rate increases due to the paper work involved in setting up the new rates.

STEEL ingot output this week remains unchanged at 96.5 pct from last week's revised rate of the same level. Activity should remain around this point until steel mills are forced to make definite plans should the coal miners fail to return from their vacation on July 7. The probability of a "no contract, no work" strike is increasing as valuable time is lost without wage negotiations between coal operators and the United Mine Workers.

As expected, the British purchasing representatives who were in this country a few weeks ago returned without any substantial tonnages of steel, either semifinished or finished, from the United States. As usual they encountered a number of offers for rather large tonnages at somewhat above the mill prices in this country. But the British industry has been shopping in the American market primarily because of low mill prices here. If "open market" prices are paid by Britain for raw steel, they will probably be paid to Belgium rather than to the United States. Regardless of the source for the material any steel purchased in this country will eventually be but a fraction of the million and a quarter tons which the commission was seeking here recently. Such deals may even involve the exchange of British pig iron.

MACHINE tool makers expect Latin American countries to show a substantial gain this year in the importation of American made machine tools. More than $20 million worth of such equipment is expected to be exported from the United States this year. If this estimate holds true it will beat the previous record-breaking total of $14.5 million hung up in 1946. Prewar years such as 1939-40 recorded machine tool exports to Latin America at between $1.2 million and $2.1 million.

Bolt and nut producers have readjusted their price schedules during the past few weeks. Large sizes have been reduced in some instances while prices on the smaller sizes have advanced. The net adjustment will be upward. Pig iron producers because of higher costs may be forced to increase prices after present subsidy payments run out on June 30.

• **NEW STRIP MILL**—Republic Steel's new 48-in. strip mill in Youngstown is now in operation, rolling skelp for Republic's three Youngstown electric weld tube mills and strip for further processing into tinplate at the Niles plant. The mill was made by adding three 4-high finishing stands to the present 84-in. plate mill, together with coiling and coil conveying equipment. Capacity of the Warren 10-stand 42-in. hot mill has been severely overtaxed by the tinplate coils, and use of the new Youngstown mill will relieve this overload. It is anticipated that the new mill will eventually produce 30,000 tons of skelp for Republic's pipe mills and 20,000 tons of tinplate bands per month. Tonnages for other purposes beside tinplate and skelp may ultimately be rolled. Products of the mill will not be sold directly to the trade and will not make available increased tonnages of sheet and strip from the corporation as a whole.

• **NAVY SHELLS**—U. S. Naval Ordnance has placed their initial postwar order for 16 in. projectiles with the Carnegie-Illinois Steel Corp. Carnegie will operate the Hays, Pa., plant for the Navy and deliveries are expected to start in October.

• **OIL & GAS AS STEEL USERS**—During 1946, the oil and natural gas industry maintained its position as a major user of steel pipe and tubes, accounting for 26 pct of total shipments of these products, according to preliminary data prepared by the American Iron & Steel Institute. Total 1946 shipments to the industry at 1,225,425 net tons of tubular products, almost equalled the total of 1,228,642 net tons shipped to the group in 1940. Of that total amount shipped to the oil and gas industry during 1946, 716,424 tons went to jobbers, dealers and distributors of such products, which was the largest amount received by this group since 1940, with the exception of the abnormal war-peace year of 1941. Another 419,995 tons went directly to the oil and natural gas industry for construction purposes, including the building of pipelines, and 89,006 tons went to the industry for other purposes. The steel industry produced 4,633,231 tons of steel pipe and tubing in 1946, and about 8 pct or 385,000 tons were exported.

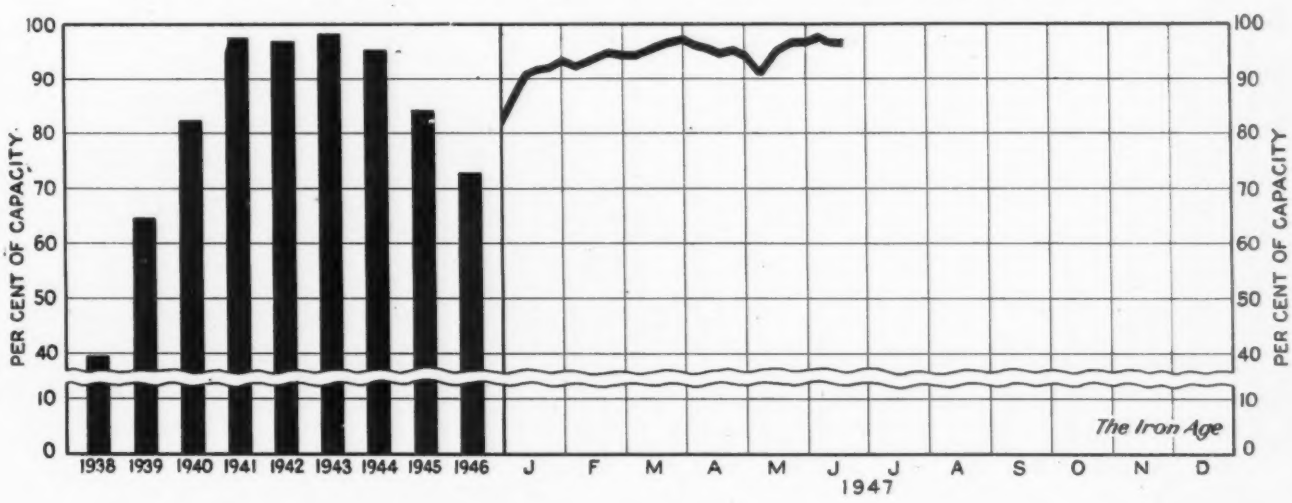
• **GENEVA FREIGHT RATE**—As the first step in its investigation of the recently lowered freight rates on iron and steel products from Geneva, Utah, to Pacific Coast points, the ICC has called a pre-hearing conference for Aug. 7. The conference will be held at the offices of the Public Utilities Commission, Denver, Colo., ICC Chairman Clyde B. Aitchison, presiding. After suspending the new rates for a full month, the ICC allowed them to go into effect on Apr. 1, but stated that an investigation would be conducted, due largely to protests from major eastern steel producers.

• **FREIGHT CARS**—The American Railway Car Institute reports that 3929 freight cars were produced during the month of May. This is a decline from the 4123 cars delivered to the railroads during April but exceeds substantially production in earlier months of the year, the institute said. A continuing uneven flow of materials to car builders' shops and strikes in several plants were responsible for the fact that deliveries for May were considerably below schedule.

• **PLANT VACATION**—Some steel consuming plants are expected to shut down completely to give mass vacations. This means loss of production but so far there is no evidence that any company is cutting down on steel shipments in a big way. A few companies have held up shipments of steel but the sizes and types are not the ones which are in the shortest supply. Wide strip and other hard-to-get items have not been cut back by those companies which plan to shut down. Some companies who have cut back on production of finished items because of inventory and lack of demand have not registered these factors in their steel ordering. All these trends send the shivers up the spines of some steelmakers because there is a chance that some of the steel which might not be used by regular customers will end up in the gray market.

• **SWEDISH IRON**—Mystic Iron Works recently unloaded its first full cargo of Swedish ore. A couple of weeks or so ago it received a small lot, but this latest shipment is the first full cargo. It is understood regular shipments of this ore are in order.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
June 10	103.0*	95.0	92.0	94.5	94.0*	102.0	100.0	99.0	99.5*	105.0	101.0	82.0	108.0	96.5*
June 17	103.5	96.0	92.0	96.0	96.0	102.0	100.0	99.0	100.5	103.0	98.0	84.0	95.0	96.5

* Revised.

British Purchasing Mission Comes to Grief Again in Steel Market

New York

• • • **Sources close to** the British steel purchasing mission which just left New York state that little steel was obtained despite several weeks of effort. This marks the second unsuccessful British effort to buy substantial tonnages in the past 9 months. This second failure will serve to sharpen the growing feeling among steel men across the ocean that America is morally obligated to allocate larger quantities of its production for export.

The tremendous gap that exists between the American viewpoint and that of Europeans generally on this point is difficult to justify. It all stems back to the difference in viewpoint on the war itself.

Americans generally look back on the war, and consider that the American manpower, industrial products, and agricultural products which were poured into the conflict represent as big an investment in victory as anyone could expect from America.

Mr. Hight recently returned from a 2-year assignment in Europe.—Ed.

While recalling the contribution mentioned above Englishmen also remember the days when England was fighting the Nazis alone on a cash-and-carry basis. The abrupt ending of lend-lease was considered by the British to be an unkind cut, and regardless of President Truman's intentions in the matter, the immediate tragic effects of the act on the British diet made the act unforgettable.

The rapid transition at the end of the war which changed England to a socialistic state has also had its effect on British thinking with respect to imports from America. Although in the main British businessmen do not support the Labor government, even the most conservative of them accept a large measure of government control in commercial and industrial matters that the average American industrialist would consider to be definitely socialistic.

The postwar mind in Britain and on the Continent is accustomed to seeing governments intercede in business affairs when there appears to be a strong economic or social reason for doing so.

Europeans Convinced America Should Export More Steel While Need Exists

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By JACK R. HIGHT
Associate Editor

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When there is insufficient steel to fulfill all the world's needs, as there is today, British sources feel strongly that the American steel industry should be willing or be forced by the American government to come forth with a larger share of its production for exports. With a mixture of logic, economics, recrimination, and wishful thinking, they are able to overlook the increased demand in this country, and the continuing gray market in the domestic field.

This feeling of resentment sometimes crops out in strange reasoning. Thus the wave of strikes in America in 1946, resulting in delayed deliveries of American goods to Europe, was soundly criticized by Europeans, who felt that America was falling down in its responsibilities.

The British steel industry has always depended on a steady importation of semi-finished steel, and the vagaries of international steel price policies since the war

Two of Britain's Aces

GONE IS THE GUNNER: *Representatives of the British Ministry of Supply, during a recent visit to the General Electric Co. at Schenectady, N. Y., examine a B-29 remotely controlled gun turret at the Marine and Aeronautics Div. Left to right, S. J. Curtis, British Supply Office, Washington; Col. E. H. Salzman, USMC, Office of the Assistant Chief of Naval Operations; Dr. W. Cawood, British Ministry of Supply, London; Capt. W. A. Brooks, USN, and Dr. C. F. Green, of GE.*

have dictated that these purchases be made in the British Dominions or in the U. S. A., rather than from Continental producers, as in prewar days.

The most important factor in the failure of a second British buying mission is that there is still no other source which can possibly furnish the quantities of steel that Britain requires except the United States. Over the next 5 years the United Kingdom would be able to use upward of 2 to 3 million tons per year. In today's conditions, no other country but America has any hopes of being able to furnish steel in such quantities.

British Ministry of Supply officials, however, are counting heavily on a recession in America that will get them all the steel they want in 1948, if not this year. They will have plenty of time to regret the failure of the second mission in the meantime.

Canadian Steel Prices Expected to Increase When Controls Cease

Toronto

• • • **Canadian steel prices** have been increasing on some of the lighter materials and producers have advanced quotations on extras, but on bars, sheets and plate the base price is unchanged from April last year. Heads of Canadian steel mills do not look for further advances in the heavy steels until price controls are abandoned. From Ottawa sources it is learned that more definite action toward decontrol of prices may be taken within the next two or three weeks. It is stated that supply and demand gradually are evening out and that the time is drawing near when prices should be permitted to reach their natural level.

Canadian iron and steel prices as a whole remain well below quotations on U. S. steels imported into this country, when duty, freight and exchange are taken into consideration. In the expectation that iron and steel prices may change with short notice, producers are accepting forward delivery orders with prices to be made known at time of shipment, thus contract commitments offer some protection with regard to delivery but not as to price.

With books open for third quarter new order placing has developed an upsurge and producers expect full commitments on production to the end of September within a week or ten days. While supply continues in excess of demand on practically all lines of steel, there has been some easing recently and consumers are obtaining steel in better volume, although not sufficient to enable full operating schedules. Demand for steel sheets, both black and galvanized, is well in excess of supply, and there seems little hope of much further improvement in sheet supply before the end of the year.

Canadian steel plate production is proving only about 50 pct of domestic requirements, thus shipbuilder, car and locomotive builders and other large consumers have been buying more extensively in the United States. Carbon bar demand is strong in the lighter sizes, and mills report no unfilled capacity within 60 days and are endeavoring to hold their forward commitments within this range. Despite increase in price and nail supply, many building undertakings are still affected by shortages, and nails have received special attention in discussions in the House of Commons recently.

The advance in pig iron prices of $6.50 per ton has had no special effect on supply or demand. Melters are taking all available supply of merchant iron, while blast furnace operators in Ontario are maintaining production close to the capacity mark. The shortage of scrap has been reflected in demand for pig iron considerably above that of pre-war days. While no actual shortage has been reported in pig iron supply to merchant consumers, no surplus stocks have been built up.

Puts Tube Plant on Block

Washington

• • • **A radio tube** manufacturing plant, operated at Bowling Green, Ky., during and since the war under lease by the General Electric Co., has again gone on the block.

Valued at more than $1 million, original cost, the plant was sold by WAA for $781,000 to the Electra-Voice Corp. of Chicago last February with the buyer scheduled to take over on July 1. The disposal agency has been notified that the Chicago firm is unable to complete the transaction under present conditions.

Shortage of Dollars Controls Tool Buying By European Missions

Cleveland

• • • **Postwar Europe needs** U. S. machine tools badly and will buy them in large numbers if the dollar exchange problem can be solved satisfactorily, according to Noble B. Clark, foreign sales manager, the Warner & Swasey Co.

Noble B. Clark

Mr. Clark, who returned recently from a 3 month trip covering 12 European countries, believes that European economists and business men are on the side of the U. S. machine tool builders and that the industry's problems in Europe are entirely a matter of dollar exchange.

He pointed out that prior to the war, Germany supplied a large part of the big machines, boring machines, planers and gear cutting equipment to European users, and this market is now largely available to the United States.

He added that the U. S. machine tool industry now enjoys greater prestige abroad than ever before, which is partially the result of World War II, and that U. S. machine tool builders' deliveries are by far the best of any machine tool producers. Deliveries of competitive equipment are at least a year longer.

Conditions in Europe are such that a U. S. machine tool can be set down in France for about 50 pct less than it costs the French to manufacture a similar unit. While prices of U. S. machines are up from 1939 levels, they are low for European users today.

The Czech machine tool industry, despite the war, is still intact and turning out good equipment, Mr. Clark reported, although about 40 turret lathes of the Pitler type were in stock and waiting for orders at one of the Skoda plants.

According to Mr. Clark, there will be a 10 pct increase in machine tool exports to Europe during the balance of this year. Biggest potential customers for U. S. equipment, by industry, are the electrical equipment manufacturers, the automobile builders, and the machine tool builders.

Attitude of the European nations on the U. S. government-owned machine tool surplus varies greatly, he pointed out. Many European countries have discovered that a machine tool from government surplus is still a good machine tool.

He said France, however, has no machines from surplus, because of a national policy to get only the best in machinery. But in Belgium and Holland, machines formerly part of the surplus are numerous. Many of them were purchased by companies or commissions coming to this country.

Great Britain is another source of U. S. surplus machine tools for foreign buyers. The British have been getting rid of U. S. machine tools of no value to them as rapidly as possible.

According to Mr. Clark, Great Britain will buy any U. S. machine tool which is not duplicated as to type by British builders. But British buyers cannot buy U. S. equipment even roughly duplicated in Britain, although it may cost them more money to perform the operations on British machines. Most U. S. machine tools going into England are the so-called monopoly machines.

To open up the European market completely to U. S. machine tool builders, Mr. Clark believes that the machine tool industry must continue a normal selling program, and importers must have this program ready for their governments. But most important are loans, which will have to be made in European nations to buy U. S. machine tools in the numbers anticipated.

Mr. Clark said some dollar balances are available all over Europe and people will probably invest this capital in something solid, after food needs, like machine tools. Machine tools are hard to tax, and it has been estimated that in France alone there is about $3,000,200,000 in hoarded gold. Indications are that this will be spent for food and production equipment.

Mr. Clark visualized conservatively a machine tool market in Europe amounting to about $18 million a year, and continuing for a number of years as the various industries are brought up to par.

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ALADDIN WOULD HAVE LOVED IT: *Oil company engineers inspect a new manifold terminal at the stabilizing plant at Kirkut, Iraq. It is part of a 16-in. pipeline under construction by Iraq Petroleum paralleling its 12-in. line which for the past 12 years has been pushing an annual 4 million tons of black gold across 1200 miles of desert from Kirkut to Mediterranean ports.*

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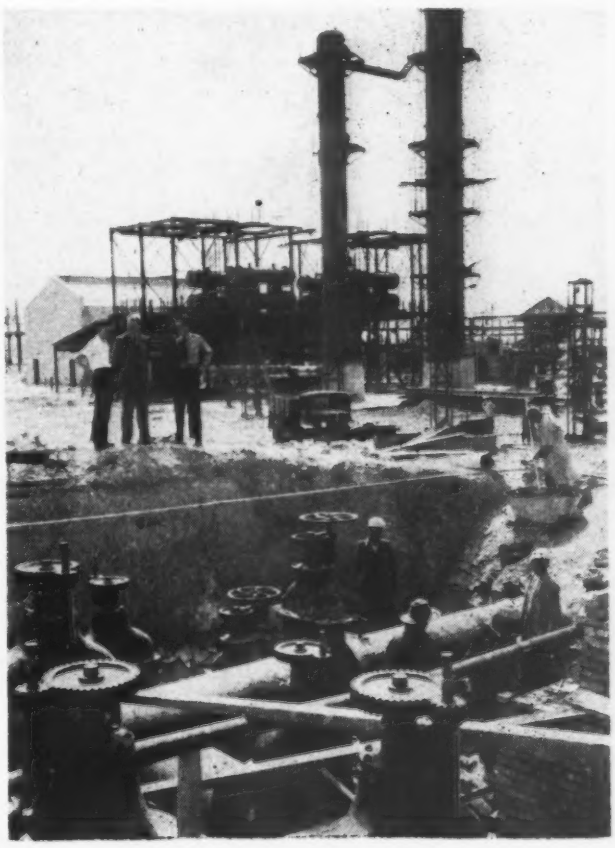

Futures Market Will Give Copper Trade Opportunity to Hedge

Wider Trading Than in Prewar Markets Is Seen on N. Y. Commodity Exchange

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By JOHN ANTHONY
Eastern Regional Editor

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New York

• • • **Consumers, producers** and dealers in copper will soon have the opportunity to hedge against adverse fluctuations in the price of copper when the New York Commodity Exchange again begins to trade on future deliveries of the metal on July 15. Plans are already afoot to begin futures trading in zinc in a short time.

Futures markets are generally a more sensitive barometer of market sentiment than that represented by quotations of producers, who strive for price stability for a long period. The market is most important to dealers in metals, particularly scrap, who must buy and sell in anticipation of future market developments. The dealer faced with the necessity of buying in metals to carry on his business at a time when he considers prices too high can hedge against the hazard of unlimited inventory losses by selling on the Exchange for delivery far enough ahead to permit him to dispose of his stocks before the maturity date of his futures contracts. If the spot price falls, his inventory loss may be entirely offset by the profit on his futures contracts. If the market rises, his inventory appreciation is offset by the loss on his futures contracts.

Custom smelters in prewar days often hedged their scrap purchases when the spot market was not sufficiently good to take current production off their hands regularly. Primary metal producers also took advantage of the futures market when current prices were at a level at which operations were profitable. The producercould sell against his expected output for as much as a year ahead.

The consumer of copper who may want to protect himself against a rising market a year in advance can buy the equivalent of this year's requirements for delivery at various months during the course of the year. Protection of his copper needs during the course of the year will have been arranged at moderate cost as the margin requirements for futures contracts are relatively small. Only about 5 pct of copper futures are actually delivered, as most consumers prefer to purchase copper of a grade and type required from a producer, at the same time closing out an equivalent amount of futures contracts. This is because the standard copper dealt in by futures contracts is blister copper, 99 pct or better, delivered in New York. The day of delivery during the month is optional with the seller.

Electrolytic copper, casting and refined copper will be deliverable at premiums above the basis price of contracts. It is expected that the premium for electrolytic copper will be 1¢ per lb as compared with the prewar premium of 0.65¢ per lb. Premiums may vary on the market from time to time and this is the only variable which consumers can't hedge against except by contracts with a broker for base metal and premiums.

Before the war, trading in copper by the New York Commodity Exchange was growing rapidly. At that time the contract unit was 25 long tons; the present contract will call for 25 short tons. In 1939, there were 19,810 contracts traded; 1938, 15,889; 1937, 14,983.

It is believed that copper futures trading now will come back into an active free market under conditions greatly changed from those before the war. The continued inactivity of the London Metal Market, prewar the most important metal trading exchange, and the suspension of the 4¢ U. S. duty on copper for 2 years are expected to enhance the breadth and activity of the copper futures market here.

Even now, in anticipation of the opening of the market, it is possible to buy electrolytic copper from dealers for monthly delivery between October and March, 1948, at slightly below the current price of 21.50¢.

Major copper producers prewar did not generally sell on the futures market in New York as the market at that time was not adequate to handle an appreciable part of their tonnage. Moreover they might have been subject to public censure for operations which would in effect tend to rig the market. Large producers of copper are reported to be not in sympathy with futures trading as it takes away from them some measure of price stabilization control. In a more rapidly fluctuating copper market which is fostered by futures activity, producers' largest customers, the brass and wire mills, have great difficulty in the constant revision of their published price schedules.

After the war, in view of the shortage of copper, it has been necessary for some brass and wire mills to have their customers obtain the copper which they would fabricate on a toll basis. With a more rapidly fluctuating market it is possible that fabricators will continue this practice on a large scale in order to protect themselves against inventory losses.

COALMAN CONTEMPLATES: *Harry Moses, of the Frick Coal Co., Pittsburgh, draws a caricature of John L. Lewis, president of the United Mine Workers, on a tablecloth during a recent mine operator's news conference in Washington.*

U. S. Steel Official Gives Details Leading to Wage Contracts

New York

• • • **When one of the biggest** industrial concerns in the world publicly pats a union on the back progress is being made in industrial relations. That is what U. S. Steel Corp. did when John A. Stephens, the firm's industrial relations vice-president, said "the United Steelworkers of America has been one of the better unions."

Talking before an American Management Assn. conference here recently Mr. Stephens added "Its [USWA] international officers believe that agreements made are agreements to be observed. In the Steelworker's we think we see a union increasingly concerned with the removal of basic causes or difficulties in the administration of the labor agreements." While Mr. Stephens qualified his kind remarks about the union by using a measurement based on the past "ten difficult years" there was no doubt of his and his company's sincerity.

"We believe that when management and labor strive consistently and intelligently in each individual enterprise to supplant suspicion and distrust with loyalty and cooperation, they are working toward the bigger goal of a united prosperous democracy," Mr. Stephens said.

In his address Mr. Stephens discussed the significance of the labor agreement between the steel producing subsidiaries of U. S. Steel and the United Steelworkers of America and told his audience of some of the thinking leading to the signing of the 2-year contract in April.

"U. S. Steel approached the recent negotiations hoping to find a way to peaceful conclusions," Mr. Stephens said. "We were convinced that after years of war and government controls. there was need to demonstrate that the interests of management and labor could be reconciled with regard for their respective rights and privileges."

He explained that in deliberations before negotiations took place, the companies had thought that the "greatest good for the greatest number" would come from a year's extension of the then existing contract, with the possibility that "the forces of production and competition" might "accelerate the trend toward declining prices."

Pats Steel Union, Officers On Back; Pleads For Human Relations

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John A. Stephens

However, he added that deliberation in the cold light of reality led to the inevitable conclusion that the only question requiring an answer was "Which would be the least harmful—a moderate wage increase or a strike with reverberations throughout the economy in general." He said that "We chose the former," as "reasoned judgment permitted no other conclusion."

Stating that a large percentage of grievances in the past had been due to "alleged inequities in wage rates," Mr. Stephens said: "This inequity job is by no means finished. To date four agreements, separate and apart from the basic labor contract have been executed. In the first agreement, Oct. 23, 1945, the parties agreed that "the fundamental principle of the work-wage relationship is that the employee is entitled to a fair day's pay in return for which the company is entitled to a fair day's work." So far, we have completed the fair day's pay part of the program. There remains the important task of determining on each job what constitutes a 'fair day's work'."

He stated that "reasonable legal regulation of union power and competitive tactics are needed over future years to aid in the continuing development of sound industrial relations." In regard to such regulation he added that, "When legislation establishes standards to which all unions must conform, the road will be smoothed toward consistent betterment in the labor-management field."

"When equality before the law becomes a fact," he added, "there will still remain the problem of adjustment of human relations—a problem hopefully to be resolved within the framework of our democratic, competitive, capitalistic system. Labor and management have not only a big job to do in this connection, but a big stake, as well, in the results."

Can Complete 750,000 Homes with Controls On

Washington

• • • **More than 750,000** new permanent type homes will be completed this year provided the government retains controls over nonresidential construction, Housing Expediter Frank R. Creedon said recently. In addition, he estimated, 250,000 conversions, trailers and other temporary types will be completed for use.

Mr. Creedon said that there is a $2 billion backlog of industrial and other nonresidential construction being held up because of material scarcity. Should restrictions be lifted and this pent-up demand be let loose, he warned, the scramble for materials would leave the home-builders out in the cold because of further skyrocketing prices.

Senate Subcommittee To Study Steel Capacity And Western Markets

Washington

• • • **As the Senate** Small Business steel subcommittee resumes its hearings on June 19, it begins a new phase of its investigation into shortages and gray markets with the immediate attention directed at existing steel capacity in relation to probable future demands on the industry.

This apparent diversion from its primary purpose is part of the revised strategy of the committee following a decision reached at an executive session last week. It was decided, with the full endorsement of Sen. Kenneth Wherry, R., Neb., Chairman of the Small Business Committee, to broaden the scope of the current inquiry.

Other lines of inquiry to be followed by the steel subcommittee before the investigation is concluded will include: (1) Historical quota distribution and whether this is the most equitable method during scarcities; (2) integration or "concentration" within the industry, the extent of such acquisitions, and their effect or relation to scarcities; (3) extent and effect, particularly as to casing and tubing, of present exports on domestic economy; and (4) recovery of war steel scrap.

The actual gray market investigation is moving to the West Coast where the subcommittee staff will begin hearings in Los Angeles on June 23. Committee information and complaints have indicated that such operations are more common and more serious there than in the East.

In an attempt to get a relatively dependable picture—showing the number of businesses and total tonnages involved—the subcommittee has been quietly conducting a survey of small plants and businesses in the various fabricating industries which are not eligible for steel quotas under the present system of distribution.

Although the work is only partially completed, a staff member said the present information has proved surprising, even to the committee. For instance, in a single industry, which requires sheet for manufacture of a home appliance, with the survey about 60 pct complete it is indicated that approximately one out of four fabricators are dependent upon the open market for their steel and are thus subject to potential premium prices.

"Thank God for the gray market," one of these small manufacturers, located in Minnesota, told the committee. "Otherwise, I would be forced to close down my business."

Scheduled to appear before the Senate group in Washington this week are Walter S. Tower, president of the American Iron & Steel Institute, and Wilfred Sykes, president of the Inland Steel Co. While their general testimony and line of questioning will obviously be concerned with the gray market and the quota system, particular attention will be paid to their views on existing steel production capacity as compared with future requirements or demand.

Also requested to appear on the same date are government economists, including Louis H. Bean, government analyst who recently prepared a study of the steel industry capacity at the request of Senator Murray, D., Mont. (THE IRON AGE, June 5, p. 96), and which has been under close study by the subcommittee.

Government reasoning directly conflicts with that of the steel industry which generally agrees with Messrs. Tower and Sykes that the present steelmaking capacity is sufficient to meet both domestic and export needs past 1950.

Decision to expand the scope of the hearing was made following a report of the subcommittee to the full committee and it is said that the steel group has been assured of sufficient funds with which to complete the job. Examination of the quota system was brought about largely through complaints during the 3 weeks of hearings that even some old customers with historical quotas were unable to obtain steel.

Likewise, attention of the subcommittee has been directed into the field of integration through complaints that when steel firms acquire an established plant, former customers of that particular facility are often neglected or cut off altogether in favor of the acquiring firm's subsidiaries, even though a historical quota existed.

Also, the subcommittee expects to go more deeply into the subject of steel exports. One day has already been devoted to witnesses from the Office of International Trade, Commerce Dept., but the information furnished was not sufficient to satisfy the subcommittee that certain steel exports were not having an unfavorable effect on domestic economy. The group is particularly concerned about exports of critically short sheet steel, pipe and tubular products. Additional statistics are being prepared by the OIT at committee request.

Coming Events

June 23-27 American Electroplaters Society, industrial finishing show, Detroit.
June 23-28 Railway Supply Manufacturers' Assn., Atlantic City, N. J.
June 25 National Assn. of Metal Finishers, Inc., annual meeting, Detroit.
June 30-July 1 American Foundrymen's Assn., chapter chairman conference, Chicago.
July 14-18 American Society of Civil Engineers, Duluth, Minn.
Aug. 25-29 National Assn. of Power Engineers, Inc., Boston.
Sept. 8-12 Instrument Society of America, conference, Chicago.
Sept. 10-12 Porcelain Enamel Institute, Inc., Columbus, Ohio.
Sept. 17-26 National Machine Tool Builders' Assn., machine tool show, Chicago.
Sept. 29-Oct. 3 American Gas Assn., San Francisco.
Oct. 2-3 Gray Iron Founders' Society, annual convention, Milwaukee.
Oct. 31 Illinois Mining Institute, annual meeting, Springfield, Ill.
Oct. 30-Nov. 1 American Society of Tool Engineers, semi-annual meeting, Boston.

Weekly Gallup Polls . . .

Half of Voters Fix Blame for Today's High Prices

Princeton, N. J.

• • • **Whom are the American** people blaming for present high prices?

The question has significance as the political parties prepare to make their bid for votes in 1948.

No one is to blame in the opinion of less than half of voters who express an opinion. But the rest all have some scapegoat in mind for the high cost of living, according to George Gallup, director, American Institute of Public Opinion.

More people blame the government and business and industry than any other single factor, a coast-to-coast poll by the institute finds. But labor unions also come in for a share of the criticism, being blamed for jacking up the cost of labor.

Other factors are named too; indeed, the variety is such as to indicate that there is no decided focusing of blame at present on any one specific thing. This may prove fortunate for President Truman and Congressional leaders of both parties when they seek reelection, for it suggests that the public mind is open to argument.

The issue of who if anybody is to blame for high prices was put to the American voters in the following fashion by the institute.

"Do you blame anyone for present high prices?"

The vote:

	Pct
Yes	49
No	41
No opinion	10

Those who say "yes" were then asked:

"Whom do you blame?"

The replies fall into the following main categories:

	Pct
Business and industry are to blame	16
Government	15
Labor unions or leaders	10
War is to blame	1
Farmers are to blame	1
Everyone's fault	7
Miscellaneous answers	5
	55

The table totals more than 49 pct because some people named more than one factor.

The survey was conducted just prior to the wide publicity given to the destruction of a government stockpile of potatoes at Foley, Ala. by pouring gasoline over them. This incident may have increased somewhat the number of people who would today blame the government for high prices of food.

Most of the people who say business and industry are to blame single out manufacturers and producers, but a few include wholesalers and retailers as the culprits.

To the extent that people do blame the government — although the blame is not heavily focused there as the poll shows—the price situation is an explosive political issue. The political parties will of course each try to blame the other.

Republican leaders will likely say that the high cost of living results from administration bungling on economic matters, while Democrats will blame high prices on the emasculation and final death of OPA at the hands of a Republican-controlled Congress.

• • • **Many Presidents** — and Mr. Truman is probably no exception—have wished that they could veto parts of bills sent by Congress for White House approval.

With a momentous veto decision confronting Mr. Truman in the shape of the labor union control bill, the President must under the constitution either reject the measure in whole or accept it in whole. Some students of government have felt that this should be changed—that the President should have the power to pick out parts of bills for disapproval, especially in the case of appropriations bills.

There is wide public support for this contention. A survey by the institute finds that among people who know what a veto is, sentiment is overwhelmingly in favor of permitting a President to veto some items in a bill without vetoing the whole measure.

In probing the public's attitude, several questions were asked to find out how much people know about the subject of vetoes.

The first question was:

"Will you tell me what the term 'veto' means to you? For example, what does it mean when the President vetoes a bill sent him by Congress?"

Public Thinks President Should Be Allowed to Veto Parts Of Any Bill Sent for Approval

o o o

Eight out of every ten voters polled (80 pct) gave a correct answer, while 20 pct gave either an incorrect answer or said they didn't know.

The 80 pct who indicated correct knowledge were asked:

"At the present time, when Congress passes a bill, the President cannot veto parts of that bill, but must accept it in full or veto it. Do you think this should be changed so that the President can veto some items in a bill without vetoing the entire bill?"

The vote of those who gave a correct definition was:

	Pct
Yes	49
No	21
Don't know	10
	80

The favorable ratio is more than 2-to-1.

Opinion on the matter of vetoing parts of bills was tested once before, in 1945. During that year's Congressional session, Senator Vandenberg of Michigan proposed to allow the President to veto parts of appropriations bills. His proposal died in committee, but an institute poll at the time found the public for it by a substantial majority.

To see how many voters are accurately informed about Congressional powers in regard to a veto, the institute put this question to the 80 pct who indicated correct knowledge of the meaning of the word veto.

"If the President vetoes a bill, can Congress override his veto?"

The results show the public very well informed.

	Pct
Yes, it can override	70
No, it can't	4
Don't know	6
	80

(CONTINUED ON PAGE 140)

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1947

(Preliminary)

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production, all companies (Net tons)	Number of weeks in month
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
February	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
March	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st Quarter	*18,989,581*	*95.0*	*1,077,901*	*84.8*	*875,312*	*69.9*	*20,942,794*	*93.1*	*1,628,522*	*12.86*
* April	6,360,294	95.4	375,675	88.6	306,844	73.5	7,042,813	93.8	1,641,681	4.29
† May	6,633,203	96.4	372,823	85.1	326,802	75.8	7,332,828	94.6	1,655,266	4.43
June										4.29
2nd Quarter										*13.01*
1st 6 Months										*25.87*
July										4.42
August										4.43
September										4.28
3rd Quarter										*13.13*
9 months										*39.00*
October										4.43
November										4.29
December										4.42
4th Quarter										*13.14*
2nd 6 months										*26.27*
Total										52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons Bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of January 1, 1947 as follows: Open hearth 81,010,990 net tons, Bessemer 5,154,000 net tons, Electric 5,076,240 net tons, total 91,241,230 net tons.

* Revised
† Preliminary figures, subject to revision.

YEAR 1946

Period	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		*Calculated weekly production, all companies (Net tons)	Number of weeks in month
	*Net tons	Percent of capacity	Net tons	Percent of capacity	*Net tons	*Percent of capacity	*Net tons	Percent of capacity		
January	3,530,192	51.1	207,512	47.4	135,183	28.9	3,872,887	49.6	874,241	4.43
February	1,301,719	20.9	25,905	6.6	65,058	15.4	1,392,682	19.8	348,171	4.00
March	5,950,241	86.2	363,949	83.1	194,574	41.6	6,508,764	83.3	1,469,247	4.43
1st Quarter	*10,782,152*	*53.8*	*597,366*	*47.0*	*394,815*	*29.1*	*11,774,333*	*51.9*	*915,578*	*12.86*
April	5,336,317	79.8	286,088	67.5	238,790	52.8	5,861,195	77.5	1,366,246	4.29
May	3,702,184	53.6	153,409	35.0	217,027	46.4	4,072,620	52.2	919,327	4.43
June	5,148,660	77.0	251,253	59.2	225,860	49.9	5,625,773	74.4	1,311,369	4.29
2nd Quarter	*14,187,161*	*69.9*	*690,750*	*53.7*	*681,677*	*49.7*	*15,559,588*	*67.9*	*1,195,971*	*13.01*
1st 6 months	*24,969,313*	*61.9*	*1,288,116*	*50.4*	*1,076,492*	*39.4*	*27,333,921*	*59.9*	*1,056,588*	*25.87*
July	6,027,388	87.5	365,332	83.6	225,963	48.5	6,618,683	84.9	1,497,440	4.42
August	6,291,363	91.1	373,837	85.4	259,322	55.5	6,924,522	88.7	1,563,098	4.43
September	5,951,232	89.2	371,465	87.8	232,869	51.6	6,555,566	86.9	1,531,674	4.28
3rd Quarter	*18,269,983*	*89.3*	*1,110,634*	*85.6*	*718,154*	*51.8*	*20,098,771*	*86.8*	*1,530,752*	*13.13*
9 months	*43,239,296*	*71.1*	*2,398,750*	*62.2*	*1,794,646*	*43.6*	*47,432,692*	*69.0*	*1,216,223*	*39.00*
October	6,312,604	91.4	387,933	88.6	251,205	53.8	6,951,742	89.0	1,569,242	4.43
November	5,873,264	87.8	318,350	75.1	266,157	58.8	6,457,771	85.4	1,505,308	4.29
December	5,286,799	76.7	222,704	51.0	250,998	53.8	5,760,501	73.9	1,303,281	4.42
4th Quarter	*17,472,667*	*85.3*	*928,987*	*71.5*	*768,360*	*55.4*	*19,170,014*	*82.8*	*1,458,905*	*13.14*
2nd 6 months	*35,742,650*	*87.3*	*2,039,621*	*78.5*	*1,486,514*	*53.6*	*39,268,785*	*84.8*	*1,494,815*	*26.27*
Total	60,711,963	74.7	3,327,737	64.6	2,563,006	46.6	66,602,706	72.5	1,277,382	52.14

Note—The percentages of capacity operated are calculated on weekly capacities of 1,558,041 net tons open hearth, 98,849 net tons Bessemer and 105,491 net tons electric ingots and steel for castings, total 1,762,381 net tons; based on annual capacities as of January 1, 1946 as follows: Open hearth 81,236,250 net tons, Bessemer 5,154,000 net tons, Electric 5,500,290 net tons, total 91,890,540 net tons.

* Revised January through December, 1946.

See $20 Million Machine Tool Sales to Latin America in '47

Phenomenal Gain Is Indicated Due to Available Exchange And Current Demand

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By GENE HARDY
Washington Bureau

o o o

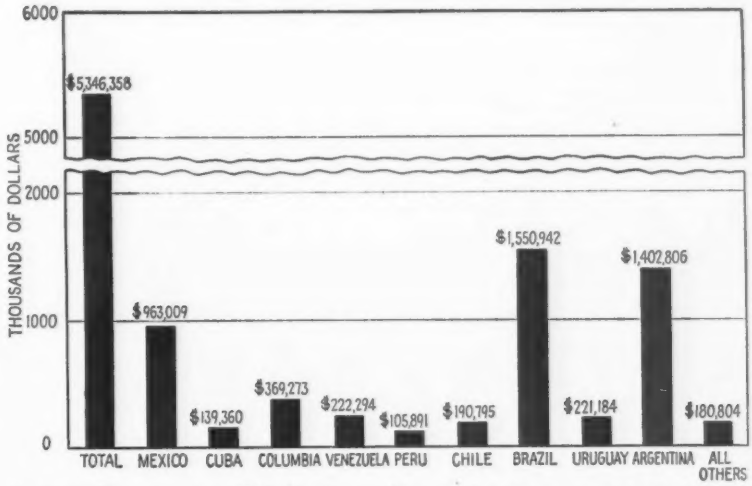
Washington

• • • **The Latin American** countries will import substantially more than $20 million worth of machine tools from the United States this year, according to informed sources and backed by first quarter export data. This record-breaking total will top the previous record of $14,438,130 set in 1946 by more than $6 million. Compared with prewar years, such as 1939 and 1940, when the nations south of the border imported $1,243,865 and $2,131,850 worth of machine tools, respectively, the increases in machine tool imports during recent years have been phenomenal. The primary reasons are: (1) Inability to obtain civilian type tools during the war years; (2) increasing emphasis on local industrialization in practically all Latin American countries; and (3) availability of foreign exchange as a result of heavy wartime and postwar exports.

The gold and exchange assets of the Latin American nations now total more than $4 billion. While exchange balances have declined during the past 18 months, it is not expected that the decline will be serious enough this year to cause any drop in imports of machine tools and other industrial equipment.

Bearing out predictions of the foreign trade experts are the first quarter 1947 export figures shown in the accompanying table. Exports from the United States are currently running at a rate well above that of last year, and a few of the smaller countries have already passed their 1946 totals.

Argentina will account for the greatest portion of the anticipated increase during 1947. Last year, due to inter-governmental difficulties, machine tool exports to Argentina totaled only $1,995,852. With these problems now ironed out and Argentina anxious to proceed with many large industrial projects, imports of machine tools from the United States will probably total about $6 million this year, as indicated by the first quarter 1947 total of $1,402,806. Brazilian imports will probably increase another $1 million over 1946 and Mexico will add at least another $500,000. An additional $1 million can be expected from all other Latin American nations. Colombia, Chile, Venezuela, and Cuba are the other important countries in relation to anticipated volume of machine tool imports.



• • • *First quarter 1947 U. S. machine tool exports to principal Latin American nations.*

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Foreign trade specialists in the Nation's capital point out that estimates of $20 million plus for Latin American machine tool trade during 1947 are likely to be in error on the conservative side. Exports during 1946 were about 50 pct higher than the original official estimates. It was originally believed that the end of the war would dry up the easy money that had been available to these countries. However, this did not eventuate, and because of the existence of many large industrialization projects imports zoomed. While strict exchange and import controls have been imposed to conserve exchange resources, they have been aimed primarily at consumer goods, and will not substantially affect machine tools and other industrial equipment for at least the remainder of this year, it is believed here.

In general, little difficulty is anticipated in importing machine tools of all types. There are, however, several factors which may bring about a temporary slump during part of the year.

These are:

(1) Uncertainty over prices. There is some fear of a sharp drop in the price level in this country. This has resulted in some hesitation about buying, but it is not as evident in products such as machine tools as it is in many consumer goods lines.

(2) Due to the unprecedented flood of imports, local credit has been strained to the limit in many countries, and this situation will affect practically all types of commodities until price trends become firm.

(3) A very serious problem is congestion of port facilities. Docks and warehouses throughout Latin America are bulging. For this reason, as well as general uncertainty about delivery dates, United States firms are cautioned to assure themselves that their agents or importers have complied with all local requirements, and particularly that import or exchange permits, where required, will be valid when delivery is made.

Observers here have stated that there is little doubt that the United States will hold a lion's share of the Latin American machine tool

(CONTINUED ON PAGE 122)

UNITED STATES MACHINE TOOL EXPORTS

		Mexico	Guatemala	British Honduras	El Salvador	Honduras	Nicaragua	Costa Rica	Republic of Panama	Panama Canal Zone
1	Engine and tool room lathes	516,304	18,868	.....	6,750	15,034	.....	16,682	4,627	.....
2	Bench type light duty lathes	292,771	2,593	557	2,364	450	981	2,586	427	1,479
3	Turret lathes, vertical	62,315	.....	2,080	.....	.....	.....	.....	.....	.....
4	Turret lathes, ram and saddle type	186,852	.....	.....	.....	.....	.....	.....	.....	.....
5	Automatic chucking and between-center lathes	31,008	.....	.....	.....	.....	.....	.....	.....	.....
6	Polishing, buffing and burnishing lathes	163,348	.....	.....	370	6,127	.....	.....	1,123	.....
7	Artillery, ammunition and boring lathes	175,781	2,174	.....	.....	.....	.....	3,799	2,180	.....
8	Vertical boring and turning mills	34,783	.....	.....	.....	.....	.....	.....	.....	.....
9	Precision boring machines	35,441	1,957	.....	.....	.....	.....	2,480	.....	.....
10	Tapping and threading machines	27,158	114	.....	50	.....	1,087	.....	334	.....
11	Automatic screw machines, bar types	11,162	.....	.....	.....	.....	.....	.....	.....	.....
12	Knee and column type milling machines	246,917	.....	.....	.....	.....	.....	.....	.....	.....
13	Other milling machines	249,664	3,764	.....	.....	.....	965	.....	.....	.....
14	Gear-cutting machines	26,129	1,084	.....	.....	.....	3,758	.....	.....	.....
15	Drilling machines, sensitive, upright & gag (except bench type)	114,991	.....	.....	491	251	.....	392	631	2,995
16	Radial drilling machines	76,615	.....	.....	.....	.....	.....	4,652	.....	.....
17	Other drilling machines	138,305	135	85	835	140	12,052	1,265	479	.....
18	Planers	37,960	.....	.....	.....	.....	.....	.....	.....	.....
19	Shapers, except gear type	157,515	3,942	.....	.....	.....	.....	3,413	.....	.....
20	Surface grinding machines	91,214	649	.....	.....	.....	.....	.....	.....	635
21	External cylindrical grinding machines (except universal)	57,475	.....	.....	.....	.....	.....	.....	.....	.....
22	Internal grinding machines	6,005	2,016	.....	.....	.....	.....	.....	.....	.....
23	Tool and cutter grinding machines	142,506	5,136	142	835	2,013	47	366	2,058	2,153
24	External cylindrical universal grinding machines	85,342	.....	.....	.....	.....	.....	.....	820	.....
25	Gear-tooth grinding machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Honing and lapping machines, except gear type	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	Thread grinding machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Metal grinding machines, n.e.s.	111,703	160	.....	772	459	953	1,363	1,793	100
29	Metal grinding machine parts	28,354	2,424	.....	1,271	475	1,738	689	27	575
30	Horizontal boring, drilling and milling machines	68,572	.....	.....	.....	.....	.....	.....	.....	.....
31	Broaching machines—all types	888	.....	.....	.....	.....	.....	.....	.....	.....
32	Gear-honing & lapping machines & gear-finishing machines, n.e.s.	2,980	.....	.....	.....	.....	.....	.....	.....	.....
33	Power-driven metalworking machine tools, n.e.s.	309,970	7,098	.....	1,004	997	1,352	3,817	3,974	457
34	Chucks for machine tools	134,706	337	.....	38	1,151	84	1,559	52	722
35	Machine tool parts, n.e.s.	307,065	8,424	.....	3,377	470	11,578	1,790	4,646	5,603
	TOTAL	3,931,799	60,875	2,844	18,157	27,567	34,575	44,853	23,171	14,719

FIRST QUARTER

		Mexico	Guatemala	British Honduras	El Salvador	Honduras	Nicaragua	Costa Rica	Republic of Panama	Panama Canal Zone
1	Engine and tool room lathes	143,998	12,218	.....	.....	.....	700	8,593	627	.....
2	Bench type light duty lathes	51,331	2,484	.....	1,284	.....	854	400	2,016	1,098
3	Turret lathes, vertical	36,354	.....	.....	.....	.....	.....	.....	.....	.....
4	Turret lathes, ram and saddle type	3,074	.....	.....	.....	.....	.....	.....	.....	.....
5	Automatic chucking and between-center lathes	8,135	.....	.....	.....	.....	.....	.....	.....	.....
6	Polishing, buffing and burnishing lathes	51,313	.....	.....	750	1,700	415	.....	.....	.....
7	Artillery, ammunition and boring lathes	68,275	2,289	.....	1,891	.....	.....	.....	45	.....
8	Vertical boring and turning mills	37,189	.....	.....	.....	.....	.....	.....	.....	.....
9	Precision boring machines	1,086	.....	.....	.....	.....	.....	.....	.....	.....
10	Tapping and threading machines	12,455	.....	.....	.....	.....	.....	2,126	.....	.....
11	Automatic screw machines, bar types	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	Knee and column type milling machines	26,851	7,090	.....	.....	.....	.....	.....	.....	.....
13	Other milling machines	69,403	.....	.....	.....	685	.....	.....	.....	.....
14	Gear-cutting machines	4,874	.....	.....	5,306	.....	.....	.....	.....	.....
15	Drilling machines, sensitive, upright & gag (except bench type)	37,861	.....	.....	240	748	.....	.....	.....	630
16	Radial drilling machines	9,660	.....	.....	3,969	400	.....	.....	.....	.....
17	Other drilling machines	20,164	1,186	.....	.....	5,800	.....	1,560	801	.....
18	Planers	2,623	.....	.....	.....	.....	.....	1,173	.....	.....
19	Shapers, except gear type	37,150	950	.....	.....	.....	526	.....	.....	.....
20	Surface grinding machines	16,267	.....	.....	.....	.....	.....	.....	.....	.....
21	External cylindrical grinding machines (except universal)	1,055	.....	.....	.....	.....	.....	.....	.....	.....
22	Internal grinding machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
23	Tool and cutter grinding machines	33,475	.....	.....	.....	.....	779	874	1,713	450
24	External cylindrical universal grinding machines	1,532	.....	.....	.....	.....	.....	.....	.....	.....
25	Gear-tooth grinding machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
26	Honing and lapping machines, except gear type	.....	.....	.....	.....	.....	.....	.....	.....	.....
27	Thread grinding machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
28	Metal grinding machines, n.e.s.	20,995	53	.....	396	.....	80	120	197	.....
29	Metal grinding machine parts	12,419	.....	.....	.....	.....	2,380	.....	99	.....
30	Horizontal boring, drilling and milling machines	.....	.....	.....	.....	.....	.....	.....	.....	.....
31	Broaching machines—all types	167	.....	.....	.....	.....	.....	.....	.....	.....
32	Gear-honing & lapping machines & gear-finishing machines, n.e.s.	.....	.....	.....	.....	.....	.....	.....	.....	.....
33	Power-driven metalworking machine tools, n.e.s.	165,184	1,190	.....	.....	904	595	398	983	.....
34	Chucks for machine tools	17,023	99	.....	230	.....	.....	120	.....	111
35	Machine tool parts, n.e.s.	73,096	3,069	.....	142	1,203	753	768	991	3,257
	TOTAL	963,009	30,628	.....	14,208	11,440	7,082	16,132	7,472	5,546

Source: Official Foreign Trade Statistics, Department of Commerce.
Compilation: THE IRON AGE.

YEAR 1946

(New, Used and Surplus)
Latin American Area—In Dollars

Cuba	Haiti	Dominican Republic	Colombia	Venezuela	Ecuador	Peru	Bolivia	Chile	Brazil	Paraguay	Uruguay	Argentina	TOTAL	
72,402	3,600	24,334	214,302	118,102	7,569	74,957	12,969	82,389	508,142	.....	37,540	85,127	1,819,698	1
26,878	552	1,326	56,766	10,901	7,773	14,099	4,877	21,888	72,216	.....	19,116	44,993	585,593	2
14,995	.....	4,941	15,007	.....	.....	.....	.....	.....	47,237	.....	3,113	23,271	172,939	3
9,880	.....	.....	48,232	.....	.....	.....	.....	.....	187,451	.....	4,907	197,394	634,716	4
.....	.....	.....	.....	6,728	.....	.....	.....	.....	239,427	.....	.....	28,611	305,774	5
14,214	.....	150	67,492	63,133	5,459	8,449	2,852	35,334	148,335	895	32,033	62,405	609,719	6
30,711	.....	1,150	70,297	51,432	2,398	20,972	.....	26,972	197,697	5,553	69,549	60,423	721,088	7
.....	.....	.....	.....	.....	.....	4,048	.....	14,059	63,127	.....	.....	28,668	144,681	8
.....	.....	.....	2,848	2,593	.....	995	.....	1,848	88,155	.....	.....	30,417	166,734	
2,440	.....	.....	1,716	14,978	.....	2,095	648	4,151	100,298	.....	.....	4,615	159,684	10
.....	.....	.....	.....	4,653	.....	.....	.....	.....	193,530	.....	2,762	11,247	223,354	11
1,807	.....	2,285	84,382	3,131	5,990	15,974	101	55,049	265,541	.....	14,786	301,485	997,448	12
32,356	.....	2,032	36,438	23,557	2,831	432	.....	47,778	609,699	.....	9,550	128,037	1,147,113	13
.....	.....	375	3,873	2,165	.....	17,614	.....	1,541	46,682	.....	2,165	52,257	157,643	14
5,660	588	.....	20,053	9,341	1,763	6,530	3,712	10,014	68,090	.....	1,001	45,468	291,971	15
13,600	.....	.....	23,488	1,275	4,177	.....	3,565	.....	.....	142,644	16,417	51,342	337,775	16
12,411	188	2,116	16,478	28,487	550	10,419	1,270	11,446	82,551	191	12,068	32,920	364,391	17
7,584	2,500	.....	17,901	142	.....	.....	.....	.....	133,820	.....	2,000	81,694	289,601	18
2,091	.....	3,987	24,342	19,331	1,760	5,161	1,840	24,488	153,907	.....	5,385	32,996	440,158	19
523	.....	.....	14,294	2,689	.....	437	.....	8,199	73,423	.....	7,536	47,279	246,878	20
19,490	.....	.....	.....	.....	.....	.....	.....	21,675	27,811	.....	.....	40,309	166,760	21
.....	.....	.....	.....	.....	.....	.....	.....	.....	20,300	.....	.....	51,678	79,999	22
5,998	1,554	.....	23,504	21,761	6,871	16,369	1,841	19,100	177,724	3,710	5,658	132,905	572,249	23
.....	.....	750	1,399	1,927	9,214	790	222	3,378	55,864	.....	7,744	79,268	246,718	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	15,113	.....	.....	.....	15,113	25
.....	.....	.....	.....	.....	.....	.....	.....	.....	38,463	.....	.....	10,600	49,063	26
.....	.....	.....	.....	.....	.....	.....	.....	.....	15,610	.....	.....	5,532	21,142	27
7,040	262	629	9,833	22,422	1,131	4,874	2,312	15,661	197,480	311	10,494	27,087	416,839	28
3,181	.....	46	10,234	7,112	1,226	6,750	11,468	8,649	23,552	80	473	16,201	124,525	29
.....	.....	.....	39,813	.....	.....	.....	.....	83,890	194,178	.....	.....	87,029	473,492	30
.....	.....	.....	.....	.....	.....	.....	.....	3,714	1,575	.....	.....	2,975	9,152	31
.....	.....	.....	1,240	.....	.....	.....	.....	1,030	1,318	.....	.....	30,307	36,875	32
31,601	623	4,277	77,096	40,756	907	32,344	1,904	63,442	307,789	280	29,941	67,940	987,569	33
12,493	265	488	25,028	10,313	5,839	14,343	1,812	33,204	138,397	647	6,754	18,948	407,158	34
54,882	651	6,877	74,896	74,770	2,708	26,062	9,537	40,350	294,513	115	11,808	74,428	1,014,528	35
382,225	10,783	55,763	980,952	541,699	68,164	283,712	60,930	639,249	4,793,015	154,426	312,800	1,995,852	$14,438,130	

1947

Cuba	Haiti	Dominican Republic	Colombia	Venezuela	Ecuador	Peru	Bolivia	Chile	Brazil	Paraguay	Uruguay	Argentina	TOTAL	
10,534	728	3,760	65,432	18,572	.....	25,784	12,815	27,773	193,071	.....	18,613	117,981	659,199	1
3,259	274	160	25,104	5,296	2,624	4,426	.....	16,397	24,568	.....	4,041	20,693	166,309	2
.....	.....	.....	.....	.....	.....	.....	.....	.....	23,840	.....	.....	11,069	71,263	3
.....	.....	.....	.....	.....	.....	.....	.....	.....	66,253	.....	6,575	85,724	161,626	4
.....	.....	.....	10,559	4,950	.....	.....	.....	.....	34,450	.....	.....	81,010	139,104	5
16,113	.....	3,150	46,633	27,128	223	3,372	3,210	2,572	63,769	244	18,856	81,051	320,299	6
15,629	.....	1,915	20,827	31,721	3,225	10,095	5,775	32,907	60,450	.....	61,837	74,503	391,384	7
.....	.....	.....	.....	.....	.....	.....	.....	.....	99,698	.....	1,300	1,986	140,173	8
.....	.....	.....	2,347	.....	.....	.....	.....	3,293	10,575	.....	.....	12,560	29,861	9
390	.....	.....	761	400	.....	1,760	.....	415	10,187	.....	1,344	1,942	31,780	10
.....	.....	.....	.....	.....	.....	.....	.....	.....	40,010	.....	3,252	22,133	65,395	11
.....	.....	1,415	2,570	7,773	.....	2,396	8,140	.....	33,680	.....	39,250	150,968	280,133	12
876	3,413	500	13,574	335	318	3,656	.....	20,924	66,310	.....	3,736	43,807	227,537	13
19,371	.....	.....	9,383	1,500	.....	.....	.....	3,546	22,526	.....	.....	18,630	85,136	14
12,107	.....	.....	7,260	3,299	57	4,809	.....	6,979	46,641	.....	3,014	82,630	206,275	15
11,378	.....	.....	5,926	6,666	.....	7,667	.....	7,025	30,911	.....	7,781	43,235	134,618	16
15,812	.....	450	17,791	4,860	3,888	3,976	1,674	5,813	24,763	.....	356	18,709	127,403	17
4,250	.....	.....	3,438	.....	.....	.....	.....	1,164	18,037	.....	.....	20,420	51,105	18
6,171	1,321	750	7,200	5,847	356	6,501	.....	5,688	88,157	.....	10,276	8,992	179,885	19
2,827	.....	1,034	1,040	1,392	.....	264	.....	1,000	33,223	119	564	20,481	78,211	20
.....	.....	.....	.....	.....	.....	.....	.....	.....	45,002	.....	.....	7,484	53,541	21
600	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	51,522	52,122	22
1,713	189	2,146	3,039	5,527	1,162	1,275	2,090	5,960	93,171	.....	2,971	65,586	222,120	23
301	.....	.....	1,500	.....	.....	176	.....	504	24,127	.....	.....	45,086	73,228	24
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,167	14,167	25
.....	.....	.....	.....	.....	.....	.....	.....	.....	937	.....	1,860	.....	2,797	26
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,075	27,075	27
1,120	467	.....	4,045	3,696	.....	3,614	.....	3,317	54,145	340	1,870	52,456	146,911	28
956	.....	.....	3,063	1,377	.....	3,951	637	6,193	20,589	325	.....	8,270	60,259	29
.....	.....	.....	.....	.....	.....	.....	.....	.....	33,528	.....	.....	.....	33,528	30
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,473	2,640	31
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32
4,503	117	.....	7,912	46,184	8,588	2,682	.....	10,243	130,709	457	8,725	86,306	475,680	33
4,194	.....	.....	4,791	4,671	741	2,014	1,567	2,116	62,230	207	2,210	18,625	120,949	34
7,256	2,781	1,442	105,078	41,300	2,148	17,473	1,141	26,966	85,385	213	24,953	105,232	514,647	35
139,360	9,290	16,722	369,273	222,294	23,330	105,691	37,049	190,795	1,550,942	1,905	221,184	1,402,806	$5,346,358	

(CONTINUED FROM PAGE 119)
market for an indefinite period. Great Britain, Sweden, and Switzerland are strong competitors, but Sweden has tied her economic apron strings to Russia. British deliveries have been slow, but sources recently returned from Europe see signs of substantial improvement on this score, and are inclined to feel that Britain may be in a more competitive position in later months. Switzerland is the most important competitor in precision equipment at the present time.

As previously pointed out, Latin American gold and exchange assets, totaling more than $4 billion are declining, and the situation is expected to become serious in a few countries before the year's end. But here again, observers believe the emphasis on industrialization will keep machine tool imports relatively free of rigid exchange and import controls.

A bright spot in the exchange picture is a total of more than $300 million in undisbursed credits authorized by the Export-Import Bank. In practically all cases, these credits were granted the Latin American nations to further local industrialization projects, which means that undoubtedly a large portion of this money will be spent for machine tools and other machinery.

Briefly, the machine tool outlook and the current exchange and import control situation in the leading Latin American markets is as follows:

Argentina—The immediate outlook for United States machine tools and parts is good. This is particularly true in regard to precision machinery, which the Argentines do not make in large quantities or of many types. While the local industry has made considerable progress, the amount of machinery produced is small compared with present and future requirements. The local products, owing to the lack of high-grade materials, will not stand the strain of high production work, and generally buyers prefer imported tools.

The following are manufactured in Argentina, but not on a scale large enough to supply the market, and lacking in features necessary for precision work: Cone head lathes, capstan lathes, bench lathes, bench drilling machines, shapers, inclinable back open power presses, radial drilling machines, horizontal drilling machines, universal milling machines, eccentric punch presses, and machine tool grinders. There will be no statistics on production available until an industrial census, now underway, is completed.

According to the Argentine trade, the following are most urgently needed in this market: lathes, milling machines, universal grinders, tool grinders, turret lathes, presses, drilling machines, eccentric punching presses, shearing machines, crankshaft grinders, bench and floor grinders, and hand saws.

Argentina has large exchange balances in gold and dollars, totaling about $2 billion and there is no likelihood of any shortage in the near future. Imports are tightly controlled; only what fits in with the overall economic program is permitted. But machine tools and other machinery are badly needed.

Brazil — A small industry was developed during the war, and simple low-cost production continues. Generally, neither quality nor precision machine tools are being built. While the United States was not a major supplier during the pre-war years, due largely to more favorable European payment terms, the outlook is now good.

The following types are those which cannot be produced in Brazil or are produced in small quantities: high precision engine lathes; high precision tool room lathes; high precision turret lathes; high precision automatic lathes; boring mills; planers; slotters; milling machines; thread cutting machines; surface grinders; hydraulic wheel presses; shears, punches, etc.; bending rolls, brakes, forming machines, etc.; horizontal milling machines; horizontal boring machines; high precision bench drill presses; broaching machines and balancing machines.

Brazil is tightening up on exchange and import controls, and has already done so in regard to luxury goods. A difficult exchange situation is in prospect. Total gold and exchange balances are about $700 million. There is also substantial blocked sterling. Industrial equipment is not likely to suffer this year.

Mexico—Local production is increasing, but is still not an important factor. High-quality, precision tools are not produced. While Great Britain and Sweden have been strong in this market, United States tools are preferred and the outlook is good. There is a large demand for lathes, milling machines, drill presses, shapers and planers. Increasing interest in versatile machinery is being displayed.

Mexico is getting into a difficult exchange situation. Loans must be obtained or import controls will have to be imposed. At present, there are no exchange or import controls of any consequence. Exchange balances declined about $100 million last year and now total somewhere between $240 million and $250 million. A recent Export-Import Bank credit of $50 million will help.

Colombia — Local production is negligible. The United States has always been the leading supplier of machine tools and is expected to remain so. Colombia is tightening up on imports. A system of classifying imports as to essentiality has been put into effect for control purposes. Exchange balances declined about $35 million last year and now total about $140 million. Goods are pouring in like a spring flood.

Chile—Simple types of tools are produced locally. However, United States products are preferred because of quality and ease of operation. There is a brisk demand, and Chile is in a good exchange position. Balances declined last year from about $120 million to $80 million. A further decline is not expected this year. In fact, the outlook is better, due to higher copper prices and increased exports. Exchange receipts should increase during 1947. Import permits are required.

Venezuela — A major share of this market will be retained by the United States. Exchange-wise, the situation is extremely favorable. Balances at the end of 1946 totaled $246 million and have grown a little since. There are plenty of dollars available. In fact, demand for goods is considerably lower than the amount of available funds. There are no controls over imports or use of exchange.

Cuba—There is no local production in Cuba. The outlook for substantial increase in machine tool imports is not bright. Most purchases will be for replacement and modernization. Machine tools are not stocked owing to quick delivery from the United States. Cuba now has more than $630 million in dollar exchange. Exchange or import controls are not exercised.

Official Discloses Statistics On Future British Steel Needs

London

• • • **Details of the** statistical basis for planning on the future size of the British steel industry have been disclosed in a recent speech by Robert M. Schone, secretary of the British Iron and Steel Federation, in a speech before the Royal Society of Statisticians. The paper read by Mr. Schone also furnishes the best status report released to date on the progress of the British iron and steel industry on the modernization plan announced last year (see THE IRON AGE, May 23, 1946, p. 114).

Approximate estimates of the probable future demand for steel were given in the industry's development plan. These formed the basis of the future capacity of the industry which was aimed at in the Plan. The total demand in the 5 years 1950 to 1955 was estimated to reach 16 million long ingot tons a year, consisting of 13 million long tons for home requirements and 3 million tons for direct export.

The figure of 13 million ingot tons for home requirements was supported by the long period trend of home deliveries of steel prior to the war. Although there were wide fluctuations from year to year, there was a strong upward movement during the period, as indicated in fig. 1. A free-hand trend line drawn on the chart is projected forward without taking account of either of the two wars, giving a figure of about 13 million ingot tons as the estimated annual requirement in the period 1950 to 1955.

The sharply rising trend in the quantity of steel used in the United Kingdom is related to the industrial development of the period 1900 to 1946. The increase in the use of machinery in industry and agriculture, the growth of mechanical equipment in offices and the home, the rising volume of transport, the development of the private automobile, and the expansion in electrical generation and distribution combined to increase the use of steel.

Mr. Schone pointed out that, since this kind of development was common to most industrial countries, it is not surprising that the upward movement of steel consumption per head of the population is repeated in other principal industrial countries, as illustrated in table 1.

Modernization Plan Progress Retarded by Many Steps In Approval Setup

• • • •

In view of the preponderance of heavy industry among the consumers of steel and the fact that the activity of the durable goods industries fluctuate more widely than production as a whole, changes in steel production and consumption prior to the war had a greater amplitude than the movement of general industrial production. This is shown in fig. 2, showing index numbers of steel consumption and the Board of Trade index of industrial production for the years for which it is available—1927 to 1938.

The tendency for fluctuations in

(CONTINUED ON PAGE 160)

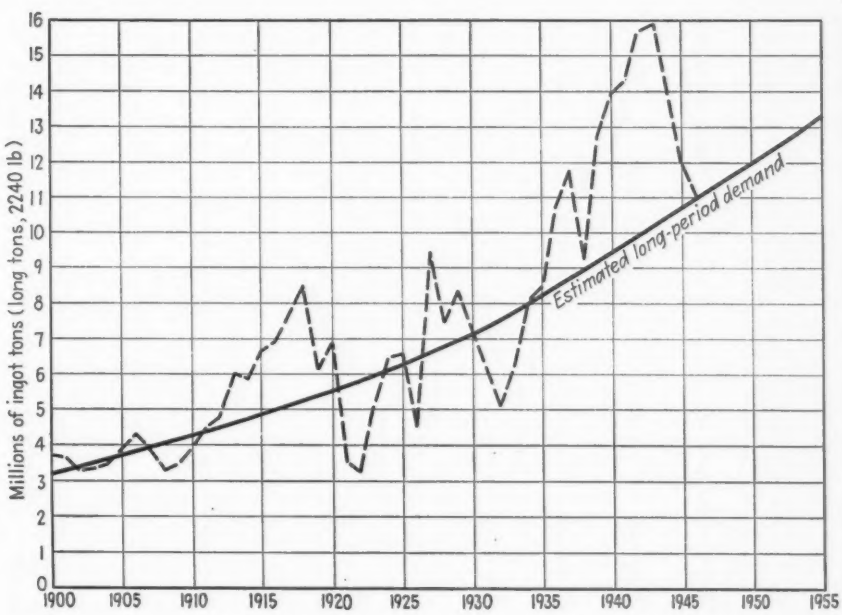

FIG. 1—Home deliveries of steel in the United Kingdom 1900 to 1946. Estimated demand to 1955. (Source—British Iron and Steel Federation.)

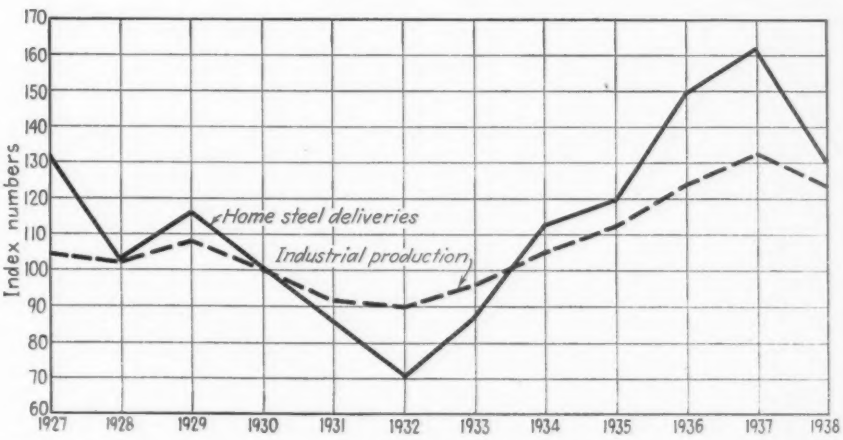

FIG. 2—Comparison of the steel production of the United Kingdom and the index of general industrial production in that country from 1927 to 1938. The base year is 1930. (Source—British Iron and Steel Federation.)

Industrial Briefs . . .

• NEW PROGRAM — The Electro Metallurgical Co. has announced a $4,250,000 dust-elimination program for its plant in Niagara Falls. The major portion of the funds will go for conversion of two open-type calcium carbide furnaces to closed type and for construction of a third entirely new covered-type furnace. Some of the work already has been started and the entire project will be completed by May 1949.

• OPENS SALES OFFICE—Joseph T. Ryerson & Son, Inc., has opened a sales office in Syracuse, N. Y.

• PURCHASE PLANT — Western Electric Co. has purchased the former Curtiss-Wright plant for approximately $3 million. Another $2 million is being expended there for new equipment. Present employment is 1850 and 2600 will be employed when the installations are completed. Western Electric took over the big plant under a 3-year lease in June 1946, and started manufacturing operations last August. The company has designated the factory as its Tonawanda Plant.

• PLANS EXPANSION — Tentative plans for an expansion program costing approximately $7,500,000 were outlined by The Pennsylvania Salt Mfg. Co.

• PLANT ADDITION—The Congdon & Carpenter Co. have announced the placing of a contract with Gilbane Building Co., Inc., to cover the erection of an addition to the present structure at Providence, R. I.

• MOVES PLANT — The Reed Engineering Co., formerly of Webb City, Mo., manufacturers of plate bending rolls, power turning rolls, welded steel products and special machinery, now occupy their newly constructed plant in Carthage, Mo.

• MOVES OFFICE—The Gas Machinery Co., of Cleveland, and Harmon & Co., engineers and distributors, have moved their offices to 919 N. Michigan Ave.

• OPENS NEW OFFICE — Ceco Steel Products Corp., Chicago, has just opened a new New York district plant and office at Hillside, N. J. The new Hillside location replaces the Ceco plant and district office formerly located in Jersey City.

• CONSULAR OFFICE — Ecuador has opened a consular office in Chicago to assist exporters. Luis A. Palacios, newly appointed consul of Chicago for the South American country, advised that there is an urgent need in Ecuador for machinery and agricultural equipment, and such consumer items as refrigerators, oil stoves, radios, automobiles, etc. Mr. Palacios said that Ecuador is conserving its dollar balances acquired during the war by requiring import licenses.

• SETS UP ORGANIZATION—The Vulcan New England Co., an industrial consulting organization, was established recently with headquarters in West Hartford, Conn. Roger Tarpy is managing director.

• COMPLETE WAREHOUSE — Caine Steel Co. of California have just completed their first new warehouse at Emeryville, designed as a completely integrated steel service center. The new facility is 68,000 sq ft, housing shearing machines, planagraph cutting tables, slitting and roller leveling equipment.

• MINERALS YEARBOOK — The latest volume of the Minerals Yearbook of the Bureau of Mines has just come off the presses at the Government Printing Office. The new Yearbook gives detailed data on the production, distribution, and consumption of all known mineral commodities for the calendar year 1945. Bound copies of the Yearbook can be obtained only from the Superintendent of Documents of the Government Printing Office in Washington. The book costs $4, but separate chapters are available at prices ranging from 5 to 20c.

New Sears Roebuck Catalog Shows Price Reduction of 10 Pct

Chicago

• • • **A downward trend** in the prices of goods sold by the country's largest merchandiser was announced recently. The Sears Roebuck Co. in its mid-summer 1947 catalog features sharp price reductions in both soft and hard goods.

Hardware, including garden tools and hose, show reductions which average 8 pct with some items down as much as 23 pct. Automobile accessories, including tires, show average reductions of 7 pct with individual items reduced as much as 24 pct. For the first time in 5 years, the book carries a full line of power tools, including wood and metal lathes, drill presses, saws, planers and sprayers.

In the soft lines the reductions are even more drastic. Home furnishings, including such lines as furniture and housewares, show average reductions of 9 pct, with individual items down as much as 34 pct. Women's clothing, including shoes, show reductions averaging 13 pct and men's clothing, including shirts and shoes, show reductions averaging 9 pct. Children's clothing, including shoes, show average reductions of 12 pct with some individual markdowns as high as 32 pct. Drugs and cosmetics show reductions averaging 18 pct, with individual reductions as much as 49 pct. Sporting goods average reductions of 9 pct and on single items are down as much as 15 pct.

Compared with the prices in Sears spring and summer general catalog, the average price reduction on all sales items in the new book amount to a 10 pct markdown.

Reports 6 Months' Income

Detroit

• • • **Net profit of** International Detrola Corp. and subsidiaries for the 6 months ended April 30, total $1,168,093 after tax provision, according to C. Russell Feldmann, president of the company.

Sales for the first half of the company's fiscal year aggregated $36,130,351, only slightly less than the 1946 yearly total of $40,810,028.

Construction Steel . . .

• • • **Fabricated steel awards** this week included the following:

800 Tons, Hazelton, Pa., St. Joseph's Hospital, to Lehigh Structural Steel Co., Allentown, Pa.

700 Tons, Comstock, Mich., power plant building for Consumers Power Co. to American Bridge Co., Pittsburgh.

200 Tons, Davis Junction, Ill. FI-142-17 for Winnebago Co. to Duffin Iron Co., Chicago.

180 Tons, Parkersburg, W. Va., American Viscose Co., steel supports, to American Bridge Co., Pittsburgh.

180 Tons, South Bend, Ind., building for Oliver Co. to Elkhart Bridge & Iron Co., Elkhart, Ind.

130 Tons, Adrian, Mich., highway bridge to Yeager Bridge & Culvert Works, Port Huron, Mich.

• • • **Fabricated steel inquiries** this week included the following:

2800 Tons, Plymouth, Pa., Pennsylvania Dept. of Highways, bridge over Susquehanna River, June 20.

1600 Tons, Montague, Mass., Massachusetts Dept. of Highways, bridge over Connecticut River, bids in.

1600 Tons, Camden, N. J., Our Lady of Lourdes Hospital, postponed to June 24.

855 Tons, Chicago, public works improvement subway E. 83rd St.

750 Tons, North Baton Rouge, La., Solvay Process Co. building extension.

500 Tons, St. Louis, garage, city of St. Louis.

400 Tons, Philadelphia, Ortlieb Brewing Co. addition.

300 Tons, East Stroudsburg, Pa., hospital, July 10.

260 Tons, Illinois and New Mexico, bridge repair, Sante Fe R.R.

255 Tons, Yavapai County, Ariz., Santa Maria River bridge, Wickenburg-Kingman highway, Arizona State Highway Commission, Phoenix, to June 25.

190 Tons, Chicago, bids registered for Powers building June 16.

140 Tons, Wytheville, Va., Wytheville Knitting Mills, bids in.

• • • **Reinforcing bar inquiries** this week included the following:

730 Tons, San Francisco, for Coulee City, Wash., U. S. Treasury Dept. Inv. SF-3921-47, to June 13.

600 Tons, Miles City, Mont., veterans hospital, bidding on July 8.

205 Tons, Yavapai County, Ariz., Santa Maria River bridge, Wickenburg-Kingman highway, Arizona State Highway Commission, Phoenix, to June 25.

190 Tons, San Francisco, for Westley, Calif. and Ft. Collins, Colo., U. S. Treasury Dept. Inv. SF-3991-47, to June 12.

• • • **Railroad car inquiries** this week included the following:

B & O R.R. is inquiring for 300 new cars. Inquiries are out for wheels and axles for 2000 50-ton capacity hopper cars and 1000 70-ton capacity hopper cars.

Pullman Standard Car Mfg. Co. is asking for wheels for 200 70-ton gondolas and 100 70-ton hopper cars for Chicago & Illinois Midland R. R. Co.

Lowers Estimates Of '47 Prefab Homes Under Guaranteed Contracts

Washington

• • • **Estimates of** total 1947 production of prefabricated houses under government guaranteed market contracts has been revised downward from more than 90,500 to about 60,000, according to the Office of the Housing Expediter.

Three producers with a scheduled production of 24,900 houses use steel paneling in construction and two, with an estimated output of 3150, use aluminum.

Two other producers under contract make varied use of metal—one, with an estimated production of 2500 houses, is using steel sheets glued to a plywood core while the other, with a scheduled output of 250, will use a panel composed of thin aluminum sheets glued to a combination paper-plastic core.

Producers of steel homes now under contract and who presently estimated production are: Lustron Co., Chicago, 14,500; William H. Harman Corp., Philadelphia, 10,000; and, Metal Homes Co., Los Angeles, 350.

Those prefabricating houses from aluminum are: General Homes, Inc., Columbus, 1700; Fox Metal Products Corp., Denver, 1450.

The Fairport Materials Corp., New York, is the maker of the steel-plywood houses and the Southern California Homes, Inc., Downey, Calif., produces the aluminum-plastic-paper housing.

Likewise a guaranteed market contract exists with the International Roll Forming Co., New York, to produce in 1947 some 6 million lineal ft of aluminum house siding, a new type of housing material.

Total guaranteed market contracts now in force number 20 for prefabricated houses and five for new types of building materials.

McKee Reports High Rate of Construction

Cleveland

• • • **Arthur G. McKee & Co.** reports that new plant construction in the iron and steel and petroleum refining industries is still continuing at a high rate in this country and a substantial volume of new contract work during the first five months of 1947 was obtained.

New work includes several domestic petroleum refining plants and a blast furnace in the Chicago district. While there are indications of a leveling off in the present high rate of new plant construction in this country, the materialization of present promising prospects which the company has in several foreign countries would offset to a great extent any decline in the volume of the company's domestic contract work.

McKee's large volume of work in process continues to be greatly hampered by slow deliveries of materials and equipment and by an inadequate supply of skilled labor.

Canadian Price Control Still on Iron, Steel, Tin

Ottawa

• • • **While numerous articles** were dropped from price control in Canada, effective June 9, including copper, lead and zinc, no action was taken with regard to iron and steel and their products. Wartime Prices and Trade Board has issued the following list in the metals group which remain subject to maximum price regulation:

Basic iron and steel products and alloys including pig iron, ingots, bars, plate, rods and wire, and cast iron and steel scrap. Primary and secondary tin and alloys containing more than 95 pct tin. Practically all items of farm machinery, stationary gas engines, barbed wire and other fencing wire and fences. Also furnaces and other heating equipment, except portable electric heaters, fireplace heaters, grates and baskets thereof.

MACHINE TOOLS

. . . News and Market Activities

New Firm Orders in May Were Up But Shipments Went Down

• • • **A preliminary round-up** of reports from important segments of the machine tool industry on May business indicates that new firm orders increased slightly, shipments were down and cancellations practically doubled.

While premature estimates are often erroneous, the number of machine tool builders shopping around for contract work is ample evidence of the down-trend and suggests that the unfilled order total will again show a decrease when complete reports are available.

Good contract work, broadly complete machines or complete units, is in sharp demand by machine tool builders. A major producer in the Cleveland area has recently taken on the contract manufacture of a paper cutter. With $1 billion capacity, and something less than $300 million in orders this year, the machine tool industry contract work is likely to achieve a new permanence.

As is usually the case, a sharp flurry of buying preceded the recent price increases, some of which became effective June 10. A few producers sold as many machines in a brief period prior to the effective date as they did in the entire month of May. According to some observers, June will prove to be a pretty good month for some machine tool builders, particularly in lathes and grinders.

Despite the amount of business that came in, trade sources do not believe that higher prices will dry up the market. Some brief lull is expected, but interest in the machine tool show alone is expected to give impetus to some buying throughout the summer, particularly since some of the show machines will be available before September.

In Detroit a survey of machine tool dealers and producers reveals little change in the market. Some segments report a good flow of inquiries and orders, but substantial new commitments are spotty. An exception is a large inquiry from a major auto producer this week for machines aggregating nearly a million dollars. It is not known whether this equipment will be used for new models or for product improvement.

Number of Builders Seeking Contract Work Suggests Backlogs Down Again

o o o

An interesting report has it that machine tool inquiries from Mexico for some types of equipment are "flooding the market." It is believed the new equipment will be used to replace hand labor on many items sold to Mexico's growing tourist trade.

Increasing protest against WAA regulations is evident from the fact that more than 20 Detroit machine tool dealers have withdrawn during the past month from participation in the sales of surplus equipment. Particularly distaseful to some dealers is the fact that all machines must be now cataloged before they are offered for sale. Under the present arrangement, many dealers report there is no longer any chance to locate equipment for a specified buyer and later make the purchase. On the other hand, dealers feel that holding of spot sales simultaneously in different parts of the country is definitely a constructive step by WAA.

In Cincinnati, reliable sources in the trade report an influx of orders as a result of the price situation, but a number of plants are still loaded with contract work and the machine tool business generally is at a low ebb. Foreign business remains spotty, and trade sources report that good orders are coming in about every three months. In some quarters it is felt with the government holding up on some of the loans to foreign countries, ordering from such sources will remain very uncertain.

Plants in the Cincinnati area with contract work on brakes and presses are busy because of the demand for these items in a number of consumer products. Hydraulic press manufacturers are busy with orders from southern oil pressing companies which during the war were forbidden to press soy beans, peanuts, etc., and are now buying heavily to retool their plants.

In the East, following a period of 10 days in which tools could be sold at former list prices, business has dropped off abruptly, according to reports from qualified observers. Many companies with appropriation money still in the till got aboard the bandwagon, and according to some manufacturers' representatives, the 10-day period was reminiscent of the war when it did not take a lot of persuasion to close a sale. In some quarters it is felt that business will be pretty slow until after the show, but recent business boosted backlogs and some producers feel more confident.

Dealers continue to report that new inquiries are holding up fairly well, and apparently there is no evidence of orders being held up yet due to the vacation period.

In Washington, the Labor Dept. has reported that machine shop jobs offer good employment opportunities and jobs in this field will probably increase in spite of booms and depressions. According to a study prepared by the Department's Bureau of Labor Statistics, for the next year or so the number of machine shop jobs should remain at about the present level of 900,000, which is about 300,000 above the level of 1940. Machine shops have recently taken on many apprentices and learners, but new openings are in prospect and the long range trend in machine shop employment is upward.

The JANMAT program, for many months the core of a mild bureaucratic and congressional controversy, is barely limping along. According to an unofficial report, only 8000 machine tools have been tagged in the extremely fertile, warehoused abundance of Zone 3 which includes such centers as Detroit, Chicago, Cleveland, Cincinnati and Indianapolis.

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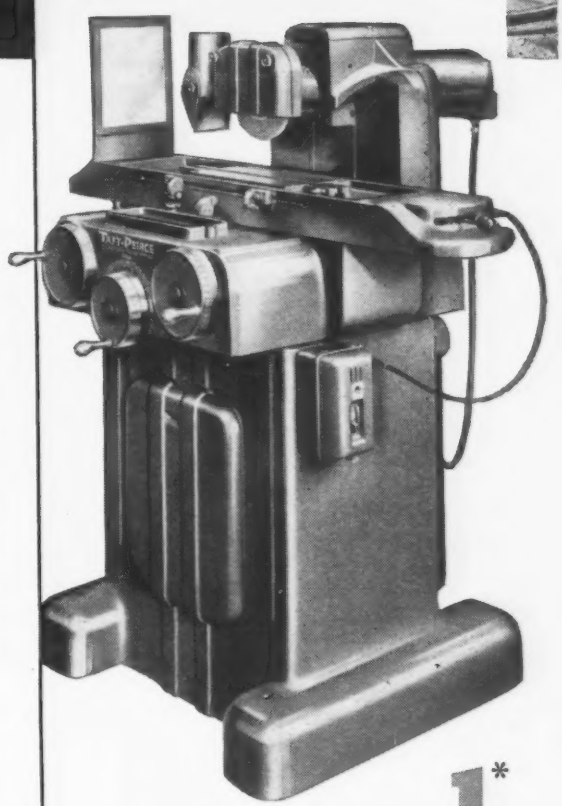

THE TAFT-PEIRCE NO. 1* PRECISION SURFACE GRINDER —with Tilting Wheelhead

T-P *means* TOP PRECISION

NONFERROUS METALS

. . . News and Market Activities

Scrap Lead Prices Down

New York

• • • **A decline in** dealers' buying prices for lead scrap highlighted the scrap market here last week. With declines of 2½¢ to 3¢ per lb, even these prices were dependent on delivery to the smelters on Monday or Tuesday of this week. Smelters are making no commitment to dealers for later deliveries as all factors anticipate impending reductions of an additional 3¢ to 5¢ per lb. Monel and German silver scrap grades are off ½¢ to 2¢ per lb. There have been a few readjustments downward in some copper and brass scrap grades but in general the prices quoted are nominal as consumer buying activity is absent.

•

Copper

• • • **The copper market** was relatively quiet last week with domestic and foreign prices stabilized for the time at 21.50¢. Export demand is very quiet but domestic demand is considerable, particularly from wire mills. It is reported that brass mill demand continues active for delivery before the vacation periods. Some producers point out that current deliveries could fall off as much as 40 pct and still remain the equivalent of the best peacetime prewar year.

May statistics of the Copper Institute indicate domestic deliveries at 122,868 tons. It is expected by the trade that June deliveries may equal or exceed this tonnage. It is not until the month of July, if then, that weakened export demand may be expected to exert any effect on the domestic price of copper. Refined and crude copper production continues at peak high levels, 110,670 tons of refined, 76,592 tons primary and 13,964 tons of secondary, the highest levels for the year. Refined stocks at the end of May were down to 77,716 tons from 81,643 the previous month.

•

Lead

• • • **Lead demand** continues pressing and producers are anticipating a decline in production in July when mines and smelters shut down for vacations. However, this curtailed production is expected to be balanced by similar shutdowns among consumer's plants. The lead stockpile is expected to be exhausted in July so that all subsequent requirements must be met fully out of current production and imports. The drop in lead scrap demand and prices is attributed to the fact that smelters were overloaded with scrap at the highest prices. However it is predicted that the scrap weakness will be shortlived inasmuch as there are no significant tonnages apparent behind the current dealer stocks.

•

Zinc

• • • **The zinc market** is reported to be steady but the only grade that is not in ample supply or in balance with demand is Prime Western. This grade continues to be actively sought after. There is some talk in the industry of certain smelters setting up to debase higher grades with needed impurities in the form of scrap in order to meet the galvanizer's demand. Some producers are reported to be already thinking about stockpiling High Grade. By the addition of scrap to higher grades of zinc, it is said the trade may be able to produce the lower-grade Prime Western to sell at its lower price without any appreciable loss in overall return.

•

Canada Drops Ceilings

Toronto

• • • **Canadian price** ceilings have been abandoned on copper, lead and zinc, Wartime Prices and Trade Board has announced, and domestic nonferrous metal prices have moved up in line with New York quotations. Current price on copper is 21½¢ per lb, lead, 14¼¢ per lb, and zinc, 11¢ per lb. Secondary metals prices also have been decontrolled. However, government ceilings continue on primary and secondary tin and alloys containing more than 95 pct tin. Ceiling price on tin is 71¢ per lb.

While tin remains in short supply in Canada, no shortage is reported for copper, lead and zinc, and consumers state they have no difficulty in obtaining sufficient for all requirements. During the period that Canadian base metal prices were under control, consumers in this country made large purchases.

•

Smelter May Continue

Washington

• • • **The Senate** this week passed a resolution renewing the authority to continue operation of the Texas City, Tex. government-owned tin smelter until June 30, 1949.

•

Develops Aluminum Foil

New Kensington, Pa.

• • • **Aluminum Co.** of America has developed a new machine that permits commercial production of a new paper-backed aluminum foil product for cigarette wrappers. The aluminum foil is solidly mounted or glued to the paper, as compared to the former method of mounting by a glue line.

Nonferrous Metals Prices

Cents per pound

	June 11	June 12	June 13	June 14	June 16	June 17
Copper, electro, Conn.	21.50	21.50	21.50	21.50	21.50	21.50
Copper, Lake, Conn.	21.625	21.625	21.625	21.625	21.625	21.625
Tin, Straits, New York	80.00	80.00	80.00	80.00	80.00	80.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	14.80	14.80	14.80	14.80	14.80	14.80

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American Laredo Tex.	33.00
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be	$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be	$27.50
Cadmium, del'd	$1.75
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Copper, electro, Conn. Valley	21.50
Copper, lake, Conn. Valley	21.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$85 to $95
Lead, St. Louis	14.80
Lead, New York	15.00
Magnesium, 99.8+%	20.50
Magnesium, sticks, carlots	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$85.00 to $87.00
Nickel, electro, f.o.b. New York	37.67
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$58 to $61
Silver, New York, cents per oz.	69.75
Tin, Straits, New York	80.00
Zinc, East St. Louis	10.50
Zinc, New York	11.005
Zirconium copper, 6 pct Zr, per lb contained Zr	$8.75

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115	19.50
No. 120	19.00
No. 123	18.50
80-10-10 ingot	
No. 305	23.50
No. 315	21.75
88-10-2 ingot	
No. 210	28.25
No. 215	27.25
No. 245	21.75
Yellow ingot	
No. 405	15.75
Manganese Bronze	
No. 421	17.50

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys:	
0.30 copper, max.	15.75
0.60 copper, max.	15.50
Piston alloys (No. 122 type)	14.50
No. 12 alum. (No. 2 grade)	14.00
108 alloy	14.25
195 alloy	14.75
AXS-679	14.25
Steel deoxidizing aluminum, notch-bar, granulated or shot	
Grade 1—95 pct-97½ pct	14.50
Grade 2—92 pct-95 pct	13.00
Grade 3—90 pct-92 pct	12.25
Grade 4—85 pct-90 pct	11.75

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	37⅜
Electrodeposited	32⅜
Rolled, oval, straight, delivered	32⅞
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer	33⅜
Zinc, Cast, 99.99	18¾
Nickel, 99 pct plus, frt allowed	
Cast	51
Rolled, depolarized	52
Silver, 999 fine	
Rolled, 1000 oz lots, per troy oz.	75¼

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	43.00
Copper sulphate, 99.5, crystals, bbls	11.50
Nickel salts, single, 425 lb bbls, frt allowed	14.50
Silver cyanide, 100 oz. lots, per oz.	60⅝
Sodium cyanide, 96 pct, domestic, 200 lb drums	15.00
Zinc cyanide, 100 lb drums	34.00
Zinc, sulphate, 89 pct, crystals, bbls, frt allowed	7.75

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier; 2S, 3S, 21.2¢; 52S, 24.2¢ 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. *Rod:* 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. *Round Wire:* drawn, coiled, B & S gage 17-18; 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base. B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16; 2S, 3S, 32.5¢: 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb. f.o.b. mill. Base quantity 30,000 lb.)

Sheet and Plate: Ma. FSa. ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, $1.25-$1.31; 24, $1.71-$1.75.

Round Rod: M, diam, in., ¼ to ⅜, 47¢; ½ to ¾, 45¢; 1¼ to 2½, 43.5¢; 3½ to 5, 42.5¢. Other alloys higher.

Square, Hexagonal Bar: M, size across flats, in., ¼ to ⅜, 52.5¢; ½ to ¾, 47.5¢; 1¼ to 2½, 45¢; 3½ to 5, 44¢. Other alloys higher.

Solid Shapes, Rectangles: M, form factors, 1 to 4, 46¢; 11 to 13, 49¢; 20 to 22, 51.5¢; 29 to 31, 59.5¢ 38 to 40, 75.5¢ 47 to 49, 98¢. Other alloys higher.

Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, $1.21; 5/16 to ⅜, $1.12; ⅜ to 7/16, 97¢; 0.058 to 0.064, 7/16 to ½, 89¢; ½ to ⅝, 81¢; 0.065 to 0.082, ⅝ to ¾, 76¢; ¾ to 1, 72¢ 0.083 to 0.108, 1 to 2, 68¢; 0.165 to 0.219, 2 to 3, 59¢; 3 to 4, 57¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	54	43
No. 35 sheets	..	41
Strip, cold-rolled	60	44
Rod		
Hot-rolled	50	39
Cold-drawn	55	44
Angles, hot-rolled	50	39
Plates	52	41
Seamless tubes	83	71
Shot and blocks	..	31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, l.c.l.	15.50
Ribbon, ton lots	14.50
Plates	
Small	13.50
Large, over 12 in.	14.50

Copper, Brass, Bronze

(Cents per pound, f.o.b. mill effective June 11)

	Extruded Shapes	Rods	Sheets
Copper	33.53	....	33.68
Copper, hot-rolled	....	30.03	....
Copper, drawn	....	31.03	....
Low brass	34.04*	31.07	31.38
Yellow brass	32.39*	29.32	29.63
Red brass	34.65*	31.68	31.99
Naval brass	29.56	28.31	34.25
Leaded brass	27.98	24.39	30.13
Commercial bronze	35.52*	32.80	33.11
Manganese bronze	33.14	31.64	37.75
Phosphor bronze, 5 pct.	53.25*	52.25	52.00
Muntz metal	29.17	27.92	32.36
Everdur, Herculoy, Olympic, etc.	37.07	35.57	38.44
Nickel silver, 5 pct.	41.20	40.28	38.67
Architectural bronze	27.94	....	....

*Seamless tubing.

Scrap Metals

(Dealers' buying prices, f.o.b. New York in cents per pound.)

Brass Mill Scrap

(Lots of less than 15,000 lb.)

Cartridge brass turnings	14¼
Loose yellow brass trimmings	15⅛

Copper and Brass

No. 1 heavy copper and wire	14½—15
No. 2 heavy copper and wire	13½—14
Light copper	12½—13
Auto radiators (unsweated)	8½— 9
No. 1 composition	11½—12
No. 1 composition turnings	11 —11½
Clean red car boxes	10 —10½
Cocks and faucets	9½—10
Mixed heavy yellow brass	7½— 8
Old rolled brass	7½— 8
Brass pipe	9 — 9½
New soft brass clippings	11½—12
Brass rod ends	10½—11
No. 1 brass rod turnings	8 — 9

Aluminum

Alum. pistons free of struts	5½— 6
Aluminum crankcases	5½— 6
2S aluminum clippings	7 — 7½
Old sheet & utensils	6 — 6½
Mixed borings and turnings	2 — 2¼
Misc. cast aluminum	5½— 6
Dural clips (24S)	5⅛— 6

Zinc

New zinc clippings	6½— 7
Old zinc	4½— 5
Zinc routings	1½— 2
Old die cast scrap	2½— 3

Nickel and Monel

Pure nickel clippings	17½—18½
Clean nickel turnings	15 —16
Nickel anodes	17½—18½
Nickel rod ends	18 —19
New Monel clippings	10 —10½
Clean Monel turnings	8 — 8½
Old sheet Monel	9½—10
Old Monel castings	7½— 8
Inconel clippings	8 — 8½
German silver clippings, mixed	7½— 8
German silver turnings, mixed	5½— 6

Lead

Soft scrap lead	10 —10½
Battery plates (dry)	5 — 5½

Magnesium Alloys

Segregated solids	8
Castings	5

Miscellaneous

Block tin	67 —68
No. 1 pewter	50 —52
No. 1 auto babbitt	38 —40
Mixed common babbitt	11½—12
Solder joints	12 —13
Siphon tops	38 —39
Small foundry type	14 —14½
Monotype	12 —12½
Lino and stereotype	11½—12
Electrotype	10 —10⅛
New type shell cuttings	10½—11
Clean hand picked type shells	4½— 5
Lino and stereo dross	5 — 5½
Electro dross	3 — 3¼

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.

Full lead sheets	18.25
Cut lead sheets	18.75
Lead pipe, manufacturing point	17.50
Lead traps and bends	List +42%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules	List +42%
Lead wool	19.50

SCRAP

. . . News and Market Activities

Steelmaking Grades Up at Several Points

New York

• • • Buyers in many of the district scrap markets were again offering somewhat higher prices for steelmaking scrap this week. The largest changes occurred at New week and at Birmingham where openhearth grades also soared by $4. Pittsburgh consumers were paying $34.50 to $35 a ton for heavy steel scrap, $2 above last week's quotations. Philadelphia prices were an average of $1.75 higher; Boston brokers were offering $1 more and St. Louis was also up $1 on No. 1 steel.

One of the most remarkable jumps of the week was in Cleveland, where the top price on railroad heavy melting steel advanced $5.50 a ton based on the latest awards. This was said to have caused a furious flurry in at least one steel mill purchasing department and it is understood that pressure will be applied to keep railroads from selling at over the going market price. Most roads, particularly those with large car-building programs under way, are expected to fall into line. Such pressure, it is recalled, was effective earlier this year.

•

PITTSBURGH—The scrap market here is strong but without any large scale activity. No single sale was of major proportions, but a number of individual tonnages are being sold, making the total quite substantial. The big mill buyers have been staying out of the market. Strength in the Youngstown area has tended to make Pittsburgh prices stronger, but even without this a representative tonnage of openhearth scrap sold this past week at $35. Railroad scrap sold last week at substantially higher prices. Heavy melting at $38 to $38.50 and the specialties at $43.50 to $44.50 a ton. Malleable cast scrap has moved to the $50 to $51 a ton range, with the market appearing stronger. Paradoxically, the turning market is out of kilter. Machine shop turnings sold in the $29 to $30 range, but short shoveling turnings, early in the week were still selling at a top price of $30 a ton. The chances are that this price will go up by the end of the week.

•

CHICAGO — The price of heavy melting scrap held at $31 to $31.50 per gross ton this week. The market is strong and developments in the coal negotiations are being closely watched for any possible effect on scrap prices. Prices of a number of railroad specialties have advanced this week including rails, axles, angles, splice bars and other items. The market for cast grades is strong and scrap is reported to be particularly difficult to obtain in satisfactory quantities and grades.

•

PHILADELPHIA — The market for all grades of scrap in this district is stronger based on broker-dealer transactions. Although there have been no mill purchases reported during the week for steel scrap, brokers are having to pay more to cover old orders. Scrap is reported to be scarce due principally to dealers holding back on commitments in a strong market. Cast grades are $1 higher based on consumer purchases.

•

NEW YORK — Prices skyrocketed this week in one of the most active markets of the year. Heavy buying for a Pittsburgh district mill and for an eastern Pennsylvania mill featured the trading. Top prices for No. 1 steel—and No. 2 and bundles were going for No. 1 this week—advanced $4. Comparable advances were posted in the lighter end of the list and cast grades were up as much as $3.50. Trade sources were inclined to call the jump in steel scrap a localized condition, doubting if orders justified a $4 increase.

•

DETROIT — Large mills in the Detroit area reentered the market this week but the amount of scrap moving is reported to be comparatively small. Openhearth and electric furnace grades are reported firmer, reflecting primarily the latest arrangements made between local mill buyers and scrap sellers. Turnings are dull and tonnages moved are very small, partly because some types of turnings generated in industrial plants are reported as being sold with No. 1 bundles. No change has been reported in cast iron scrap prices and buying has been spotty.

•

CLEVELAND — Scrap markets here and in the Valley are very strong and shipments are reminiscent of the days, not so long ago, when heavy melting was bringing $45 a ton. While shipments are good, dealers and brokers are short of scrap, and many are still scrambling to cover on some of the $31.50 orders which preceded the $35 orders which were put out by a major consumer last week in a move that took the market by complete surprise. Sales of railroad No. 1 at $38 by a major road has also had a bullish effect and rumblings are being felt in other districts where mills are buying everything they can get their hands on. Most of the $38 material went to one broker and ultimately to the specialty users, according to reports. Foundries are trying to build up inventories to 60 or 90 days, which in light of present prices and supply might mean that they are apprehensive of winter scrap prices.

•

BOSTON—Business is slow. However, with one mill coming into the market for heavy steel at $27 a ton, and another paying $21 for mixed borings and turnings, prices, with the exception of those for cast, have been given a $1 to $1.50 a ton lift. At $27, heavy steel is now $9 under the 1947 peak and $5 above the low. Top price paid for cast the past week was $46 a ton, $4 under the previous week's peak.

•

BUFFALO — The market for openhearth and blast furnace scrap was strong this week. Borings, turnings and shovelings were up $1 and dealers were taking higher prices for heavy melting steel. Foundry grades were slow, with thin spots in evidence. An example of this local condition was malleable. Other districts reported a good demand at substantially higher prices, but the limited supply reaching yards here was of the light, industrial type and the few area consumers provided an even more limited outlet.

•

CINCINNATI—The market here shows more activity than it has for several months. Many interests are now buying scrap and prices are still showing a tendency to rise. Dealers and brokers indicate there is a strong demand for all grades particularly cast.

•

BIRMINGHAM — Openhearth steel grades have advanced $4 per ton in this market and prices on all other grades except blast furnace also have increased sharply. The advances are the first here in several weeks. Movement of material to local consumers had fallen off following price rises in other areas.

•

ST. LOUIS—Prices in the St Louis industrial district were up as the result of short covering by dealers, who are fearful that the higher prices prevailing in eastern markets will be reflected in the market here. However, there has been no further action by the mills, who are said to be holding off additional purchasing until after it has been known whether there will be a coal strike. Shipments continue to decline due to floods and the use of hopper cars in which to store coal in anticipation of a coal strike.

•

TORONTO—Scrap iron and steel were not included in the list of Canada's decontrolled materials issued last week, and according to information from Ottawa it is not the intention to lift ceiling prices on scrap in the immediate future despite the serious shortage in this country. Steel mills are becoming desperate in their search for scrap and have given up hope of obtaining any large tonnages in the domestic markets and have turned to Europe as a source of supply.

IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.50 to $35.00
R.R. hvy. melting	38.00 to 38.50
No. 2 hvy. melting	34.50 to 35.00
R.R. scrap rails	40.00 to 41.00
Rails 2 ft. and under	44.25 to 45.00
No. 1 comp'd bundles	34.50 to 35.00
Hand bdld. new shts.	34.50 to 35.00
Hvy. axle turn	34.00 to 34.50
Hvy. steel forge turn	34.00 to 34.50
Mach. shop turn	29.00 to 30.00
Short shov. turn	29.50 to 30.00
Mixed bor. and turn	29.00 to 30.00
Cast iron borings	29.50 to 30.00
No. 1 cupola cast	36.00 to 37.00
Heavy breakable cast	31.50 to 32.00
Malleable	50.00 to 51.00
R.R. knuck and coup	43.50 to 44.50
R.R. coil springs	43.50 to 44.50
R.R. leaf springs	43.50 to 44.50
Rolled steel wheels	43.50 to 44.50
Low phos	39.00 to 40.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $31.50
No. 2 hvy. melting	30.00 to 30.50
No. 1 bundles	31.00 to 31.50
No. 2 dealers' bundles	30.00 to 30.50
Bundled mach. shop turn.	30.00 to 30.50
Galv. bundles	28.00 to 28.50
Mach. shop turn.	25.00 to 25.50
Short shov. turn	27.50 to 28.00
Cast iron borings	26.00 to 27.00
Mix. borings & turn	26.00 to 26.50
Low phos. hvy. forge	35.00 to 36.00
Low phos. plates	33.00 to 34.50
No. 1 RR. hvy. melt	33.50 to 34.00
Rerolling rails	38.25 to 39.50
Miscellaneous rails	37.00 to 37.50
Angles & splice bars	40.00 to 40.50
Locomotive tires, cut	39.50 to 40.00
Cut bolster & side frames	36.50 to 37.00
Standard stl. car axles	42.50 to 43.00
No. 3 steel wheels	37.50 to 38.00
Couplers & knuckles	39.00 to 40.00
Malleable	54.50 to 56.50
No. 1 mach. cast	42.00 to 44.00
Rails 2 ft. and under	41.00 to 42.00
No. 1 agricul. cast	39.00 to 39.50
Hvy. breakable cast	34.00 to 34.50
RR. grate bars	34.50 to 35.00
Cast iron brake shoes	38.00 to 38.50
Cast iron carwheels	38.00 to 40.00

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 bundles	30.00 to 31.00
No. 2 bundles	30.00 to 31.00
Mach. shop turn	25.00 to 26.00
Shoveling turn.	27.00 to 28.00
Cast iron borings	26.00 to 27.00
Mixed bor. & turn.	25.00 to 26.00
Low phos. plate	40.00 to 41.00
No. 1 cupola cast	45.00 to 46.00
Hvy. breakable cast.	36.00 to 37.00
Scrap rails	39.00 to 40.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. melting	$26.50 to $27.00
No. 2 hvy. melting	26.50 to 27.00
Nos. 1 and 2 bundles	26.50 to 27.00
Busheling	26.50 to 27.00
Turnings, shovelings	21.50 to 22.50
Machine shop turn.	21.00 to 21.50
Mixed bor. & turn.	20.50 to 21.00
Cl'n cast. chem. bor.	22.50 to 23.50
No. 1 machinery cast	43.00 to 46.00
No. 2 Machinery cast	43.00 to 46.00
Heavy breakable cast	43.00 to 46.00
Stove plate	43.00 to 46.00

DETROIT

Per gross ton, brokers' buying prices, f.o.b. cars:

No. 1 hvy. melting	$29.75 to $30.25
No. 2 hvy. melting	29.75 to 30.25
No. 1 bundles	29.75 to 30.25
New busheling	29.75 to 30.25
Flashings	29.75 to 30.25
Mach. shop turn	21.50 to 22.00
Short shov. turn	22.50 to 23.00
Cast iron borings	22.50 to 23.00
Mixed bor. & turn	22.50 to 23.00
Low phos. plate	32.75 to 33.25
No. 1 Cupola cast	35.00 to 37.00
Hvy. breakable cast.	26.00 to 28.50
Stove plate	30.00 to 32.00
Automotive cast	35.00 to 37.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$33.50 to $34.00
No. 2 hvy. melting	32.50 to 33.00
No. 1 bundles	33.50 to 34.00
No. 2 bundles	32.50 to 33.00
Mach. shop turn.	25.00 to 26.00
Shoveling turn.	25.00 to 26.00
Mixed bor. & turn.	23.00 to 24.00
Clean cast chemical bor.	30.00 to 32.00
No. 1 cupola cast.	44.00 to 45.00
Hvy. breakable cast.	43.00 to 44.00
Cast. charging box	43.00 to 44.00
Clean auto cast.	44.00 to 45.00
Hvy. axle forge turn.	33.50 to 34.00
Low phos. plate	36.50 to 37.50
Low phos. punchings	36.50 to 37.50
Low phos. bundles	35.00 to 36.00
RR. steel wheels	39.00 to 40.00
RR. coil springs	39.00 to 40.00
RR. malleable	50.00 to 52.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.00 to $30.50
No. 2 hvy. melting	27.50 to 28.00
Bundled sheets	27.50 to 28.00
Mach. shop turn.	20.00 to 21.00
Locomotive tires, uncut	33.00 to 34.00
Mis. std. sec. rails	32.00 to 33.00
Rerolling rails	34.00 to 35.00
Steel angle bars	35.00 to 36.00
Rails 3 ft. and under	33.00 to 34.00
RR. steel springs	36.00 to 37.00
Steel car axles	37.00 to 38.00
Stove plate	32.00 to 33.00
Grate bars	32.00 to 33.00
Brake shoes	32.00 to 33.00
Malleable	52.00 to 53.00
Cast iron car wheels	40.00 to 41.00
No. 1 machinery cast	36.00 to 37.00
Breakable cast	29.00 to 30.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$30.50 to $31.00
No. 2 hvy. melting	30.50 to 31.00
No. 2 bundles	30.50 to 31.00
No. 1 busheling	30.50 to 31.00
Long turnings	22.00
Shoveling turnings	24.00
Cast iron borings	23.00
Bar crops and plate	31.00 to 32.00
Structural and plate	31.00 to 32.00
No. 1 cast	38.00 to 39.00
Stove plate	34.00 to 35.00
No. 1 RR hvy. melt	31.50 to 32.00
Steel axles	31.50 to 32.00
Scrap rails	31.50 to 32.00
Rerolling rails	35.00 to 36.00
Angles & splice bars	33.00 to 34.00
Rails 3 ft. & under	33.00 to 34.00
Cast iron carwheels	32.00 to 34.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$34.50 to $35.00
No. 2 hvy. melting	34.50 to 35.00
Low phos. plate	35.50 to 36.00
Mach. shop turn.	27.00 to 27.50
Short shov. turn.	27.50 to 28.00
Cast iron borings	27.50 to 28.00
Elec. furnace punch	39.00 to 40.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	30.00 to 31.00
No. 2 bundles	30.00 to 31.00
Comp. galv. bundles	30.00 to 31.00
Mach. shop turn.	22.00 to 23.00
Mixed bor. & turn.	22.00 to 23.00
Shoveling turn.	24.00 to 24.75
No. 1 cupola cast	39.00 to 40.00
Hvy. breakable cast.	37.00 to 38.00
Charging box cast	37.50 to 38.50
Stove plate	37.50 to 38.50
Clean auto cast.	39.00 to 40.00
Unstrip. motor blks.	35.00 to 36.00
Cl'n chem. cast bor.	23.75 to 24.25

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 bundles	31.00 to 32.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	31.00 to 32.00
Mach. shop turn	21.00 to 22.00
Shoveling turn.	24.00 to 25.00
Cast iron borings	22.00 to 23.00
Mixed bor. & turn.	22.00 to 23.00
No. 1 cupola cast	35.00 to 38.00
Charging box cast	29.00 to 30.00
Stove plate	30.00 to 35.00
Clean auto cast	35.00 to 38.00
Malleable	37.00 to 39.00
Low phos. plate	34.00 to 36.00
Scrap rails	33.00 to 36.00
Rails 3 ft & under	38.00 to 40.00
RR. steel wheels	38.00 to 40.00
Cast iron carwheels	38.00 to 40.00
RR. coil & leaf spgs.	38.00 to 40.00
RR. knuckles & coup.	38.00 to 40.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$33.50 to $34.00
No. 2 hvy. melting	33.50 to 34.00
Compressed sheet stl.	33.50 to 34.00
Drop forge flashings	33.50 to 34.00
No. 2 bundles	33.50 to 34.00
Mach. shop turn.	27.00 to 27.50
Short shovel	27.50 to 28.00
No. 1 busheling	33.50 to 34.00
Steel axle turn.	33.50 to 34.00
Cast iron borings	27.50 to 28.00
Mixed bor. & turn.	27.00 to 27.50
No. 1 machinery cast	40.00 to 42.00
Malleable	55.00 to 57.00
RR. cast	43.00 to 45.00
Railroad grate bars	38.00 to 39.00
Stove plate	39.00 to 40.00
RR. hvy. melting	36.00 to 38.00
Rails 3 ft. & under	44.00 to 45.00
Rails 18 in. & under	45.00 to 46.00
Elec. furnace punch	38.00 to 39.00

SAN FRANCISCO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	25.00
No. 1 cupola cast	$32.00 to 33.00
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	14.50
No. 1 cupola cast	$35.00 to 36.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt	$20.00
Elec. furn. 1 ft. und.	$23.50 to 25.00
No. 1 cupola cast.	27.50 to 29.00
RR. hvy. melting	21.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	16.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

* Ceiling price

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel: (cents per pound)	June 17, 1947	June 10, 1947	May 20, 1947	June 18, 1946
Hot-rolled sheets	2.50	2.50	2.50	2.425
Cold-rolled sheets	3.20	3.20	3.20	3.275
Galvanized sheets (10 ga.)	3.55	3.55	3.55	4.05*
Hot-rolled strip	2.50	2.50	2.50	2.35
Cold-rolled strip	3.20	3.20	3.20	3.05
Plates	2.65	2.65	2.65	2.50
Plates, wrought iron	5.95	5.95	5.95	4.112
Stain's c-r strip (No. 302) *24 ga	30.30	30.30	30.30	30.30
Tin and Terneplate: (dollars per base box)				
Tinplate, standard cokes.	$5.75	$5.75	$5.75	$5.00
Tinplate, electro (0.50 lb)	5.05	5.05	5.05	4.50
Special coated mfg. ternes	4.90	4.90	4.90	4.30
Bars and Shapes: (cents per pound)				
Merchant bars	2.60	2.60	2.60	2.50
Cold-finished bars	3.20	3.20	3.20	3.10
Alloy bars	3.05	3.95	3.05	2.92
Structural shapes	2.50	2.50	2.50	2.35
Stainless bars (No. 302).	26.00	26.00	26.00	25.97
Wrought iron bars	6.15	6.15	6.15	4.76
Wire and Wire Products: (cents per pound)				
Bright wire	3.30	3.30	3.30	3.05
Wire nails	3.75	3.75	3.75	3.75
Rails: (dollars per 100 lb)				
Heavy rails	$2.50	$2.50	$2.50	$43.39*
Light rails	2.85	2.85	2.85	49.18*
*per net ton				
Semifinished Steel: (dollars per gross ton)				
Rerolling billets	$42.00	$42.00	$42.00	$39.00
Sheet bars	50.00	50.00	50.00	38.00
Slabs, rerolling	42.00	42.00	42.00	39.00
Forging billets	50.00	50.00	50.00	47.00
Alloy blooms, billets, slabs	61.00	61.00	61.00	58.43
Wire Rods and Skelp: (cents per pound)				
Wire rods	2.55	2.55	2.55	2.30
Skelp	2.35	2.35	2.35	2.05

Pig Iron: (per gross ton)	June 17, 1947	June 10, 1947	May 20, 1947	June 18, 1946
No. 2, foundry, Phila.	$36.51	$36.51	$36.51	$28.34
No. 2, Valley furnace	33.50	33.50	33.50	26.50
No. 2, Southern, Cin'ti	34.75	34.75	34.75	26.94
No. 2, Birmingham	29.88	29.88	29.88	22.88
No. 2, foundry, Chicago†	33.00	33.00	33.00	26.50
Basic, del'd eastern Pa.	36.92	36.92	36.92	27.84
Basic, Valley furnace	33.00	33.00	33.00	26.00
Malleable, Chicago†	33.50	33.50	33.50	26.50
Malleable, Valley	33.50	33.50	33.50	26.50
Charcoal, Chicago	45.99	45.99	45.99	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡ For carlots at seaboard.

Scrap: (per gross ton)				
Heavy melt'g steel, P'gh.	$34.75	$32.75	$29.75	$20.00
Heavy melt'g steel, Phila.	33.75	32.00	29.50	18.75
Heavy melt'g steel, Ch'go	31.25	31.25	29.25	18.75
No. 1, hy. comp. sheet, Det.	30.00	29.75	26.00	17.32
Low phos. plate, Youngs'n	35.75	35.75	35.75	22.50
No. 1, cast, Pittsburgh	36.50	36.50	37.50	20.00
No. 1, cast, Philadelphia.	44.50	43.50	41.00	20.00
No. 1, cast, Chicago	43.00	41.50	37.25	20.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$10.50	$10.50	$10.50	$7.50
Foundry coke, prompt	11.25	11.25	11.25	9.00
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro., Conn.	21.50	21.50	23.00	14.375
Copper, Lake, Conn.	21.625	21.625	21.625	14.375
Tin, Straits, New York	80.00	80.00	80.00	52.00
Zinc, East St. Louis	10.50	10.50	10.50	8.25
Lead, St. Louis	14.80	14.80	14.80	8.10
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	37.67	37.67	37.67	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	33.00	33.00	33.00	14.50

Composite Prices . .

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
June 17, 1947	2.85664¢ per lb.	$33.15 per gross ton	$33.25 per gross ton
One week ago	2.85664¢ per lb.	$33.15 per gross ton	$32.00 per gross ton
One month ago	2.85664¢ per lb.	$33.15 per gross ton	$29.50 per gross ton
One year ago	2.73011¢ per lb.	$26.12 per gross ton	$19.17 per gross ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1947	2.85664¢	2.85664¢	$33.15 Mar. 11	$30.14 Jan. 7	$39.67 Mar. 18	$29.50 May 20
1946	2.83599¢ Dec. 31	2.54490¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.29176¢	2.29176¢	23.61	23.61	$19.17	$19.17
1942	2.28249¢	2.28249¢	23.61	23.61	19.17	19.17
1941	2.43078¢	2.43078¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	23.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8	18.84 Nov. 5	17.83 May 14	13.42 Dec. 10	10.33 Apr. 29
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2	17.90 May 1	16.90 Jan. 27	13.00 Mar. 13	9.50 Sept. 25
1933	1.95578¢ Oct. 3	1.75836¢ May 2	16.90 Dec. 5	13.56 Jan. 3	12.25 Aug. 8	6.75 Jan. 3
1932	1.89196¢ July 5	1.83901¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29	15.90 Jan. 6	14.79 Dec. 15	11.33 Jan. 6	8.50 Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9	18.21 Jan. 7	15.90 Dec. 16	15.00 Feb. 18	11.25 Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 66 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Matched for weight and matched for strength

Can you ever forget the fun of using your matched "clubs" for the first time; the thrill that comes each time you swing and feel and hear that solid click peculiar to a shot that's "in the groove". But don't overlook the fact that the shafts of matched clubs are steel tubes. For only with steel tubes can you get the uniformity in strength and weight—(plus economy of manufacture) that makes matched clubs possible.

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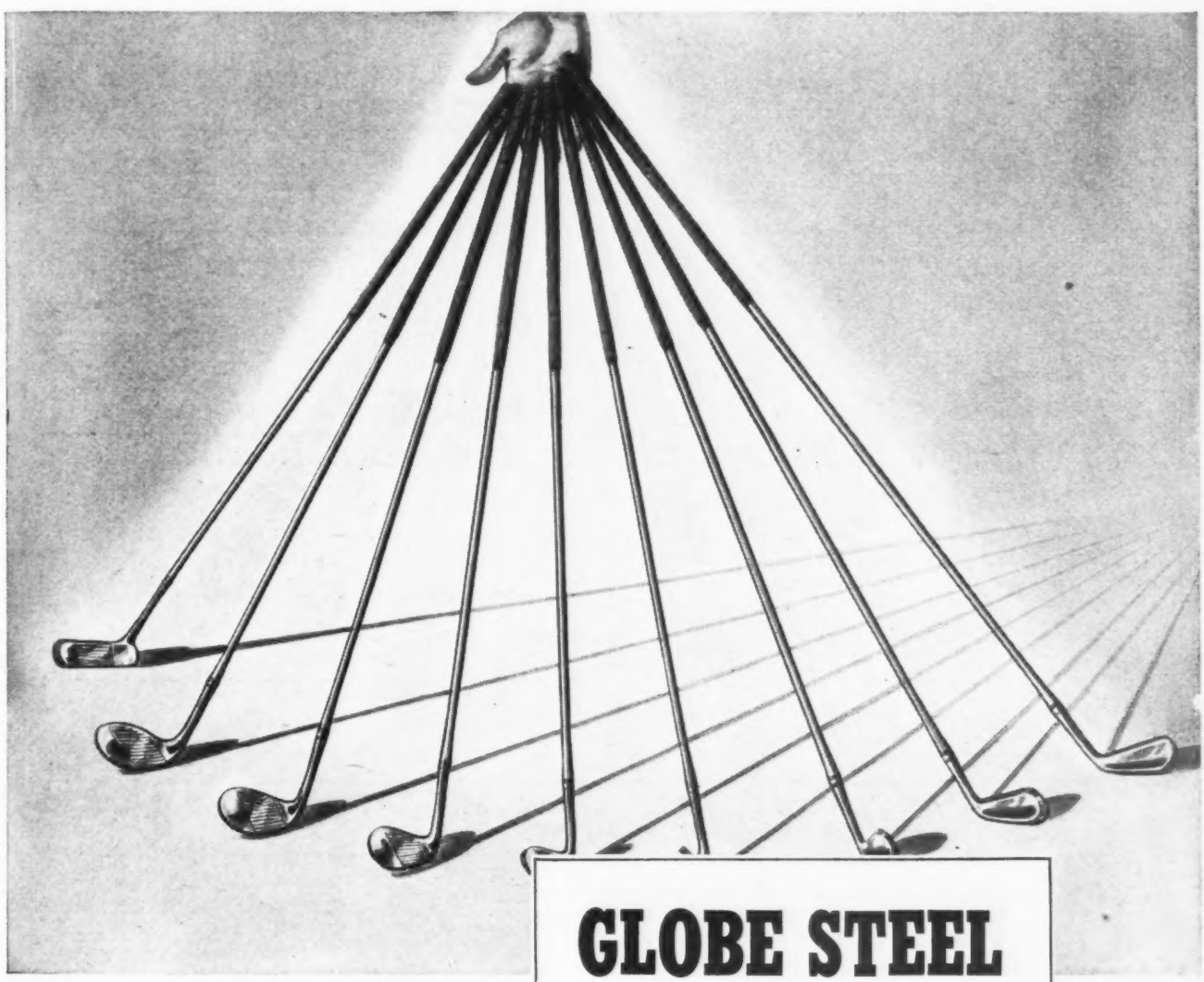


GLOBE STEEL
Tubes

Seamless Tubes—Carbon—Alloy—Stainless Steels—Welded Stainless Steel Tubing—Gloweld—High Purity Ingot Iron Seamless Tubes—Globeiron Mechanical Tubing—Pressure Tubing—Tubing for Corrosion and Heat Resisting Applications.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b basing points in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. Industry practice has discontinued arbitrary f.o.b. prices at Gulf and Pacific Ports. Space limitations prevent quotation of delivered prices at major ports. (1) Commercial quality sheet grade; primes, 25c above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. (8) Also shafting. For quantities of 20,000 lb to 89,999 lb. (9) Carload lot in manufacturing trade. (10) This base price for annealed, bright finish wire, commercial spring wire. (11) Boxed. (12) Produced to dimensional tolerances in AISI Manual Sec. 6 (13) Delivered San Francisco only: Includes 3 pct freight tax. (14) Delivered Kaiser Co. prices; includes 3 pct freight tax. (15) 0.035 to 0.075 in. thick by ¾ to 3½ in. wide. (16) Some sales are at higher prices. (17) Delivered Los Angeles; add ½c per 100 lb for San Francisco. (18) Delivered Los Angeles only.

Basing Points	Pitts-burgh	Chicago	Gary	Cleve-land	Bir-mingham	Buffalo	Youngs-town	Spar-rows Point	Granite City	Middle-town, Ohio		San Franc'co, Los Angeles, Seattle	DELIVERED TO Detroit	New York	Phila-delphia
INGOTS Carbon, rerolling	($35.00 f. o. b. mill)														
Carbon, forging	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00	$40.00								
Alloy	$52.00						Canton—$52.00)								
BILLETS, BLOOMS, SLABS Carbon, rerolling	$42.00	$42.00	$42.00	$42.00	$42.00	$42.00	(Provo—$53.20) $42.00	$42.00					$45.00		
Carbon, forging billets	$50.00	$50.00	$50.00	$50.00	$50.00	(Provo—$61.20, Duluth—$52.00[13]) $50.00							$53.00		
Alloy	$61.00	$61.00				$61.00	(Bethlehem, Massillon, Canton—$61.00)						$64.00		
SHEET BARS							$53.00		Portsmouth, Ohio—$67.20						
PIPE SKELP	2.35¢	2.35¢					2.35¢	2.35¢	(Coatesville—2.35¢)						
WIRE RODS	2.55¢	2.55¢		2.55¢	2.55¢	(Worcester—2.65¢)						3.27¢[13]			
SHEETS Hot-rolled	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.875¢	2.50¢		3.24¢[17]	2.65¢	2.79¢	2.70¢
Cold-rolled [1]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢	3.20¢		3.30¢				3.35¢	3.61¢	3.58¢
Galvanized (10 gage)	3.55¢	3.55¢	3.55¢		3.55¢		3.55¢	3.55¢	3.65¢			4.32¢[17]		3.84¢	3.75¢
Enameling (12 gage)	3.55¢	3.55¢	3.55¢	3.55¢			3.55¢		3.65¢				3.70¢	3.95¢	3.93¢
Long ternes [2] (10 gage)	3.55¢	3.55¢	3.55¢											3.95¢	3.91¢
STRIP Hot-rolled [3]	2.50¢	2.50¢	2.50¢	2.50¢[15]	2.50¢		2.50¢						2.65¢	2.93¢	2.88¢
Cold-rolled [4]	3.20¢	3.30¢		3.20¢			3.20¢			(Worcester—3.40¢)			3.35¢	3.61¢	3.58¢
Cooperage stock	2.80¢	2.80¢			2.80¢		2.80¢							3.09¢	
TINPLATE Standard cokes, base box	$5.75	$5.75	$5.75		$5.85			$5.85	$5.85		(Warren, Ohio—$5.75)		$6.157	$6.062[11]	
Electro, box (0.25 lb. / 0.50 lb. / 0.75 lb.)	Deduct 90¢ from standard coke base box price. Deduct 70¢ from standard coke base box price. Deduct 50¢ from standard coke base box price.														
BLACKPLATE, 29 gage [5]	3.60¢	3.60¢	3.60¢		3.70¢			3.70¢	3.70¢		(Warren, Ohio—$5.75)		3.99¢	3.90¢	
BLACKPLATE, CANMAKING 55 lb. to 70 lb. / 75 lb. to 95 lb. / 100 lb. to 118 lb.	Deduct $1.55 from standard coke base box. Deduct $1.65 from standard coke base box. Deduct $1.55 from standard coke base box.														
TERNES, MFG., Special coated	Deduct 85¢ from standard coke base box price.														
BARS Carbon steel	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢					3.285¢	2.75¢	3.01¢	2.98¢
Rail steel [6, 16]	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢	2.60¢									
Reinforcing (billet) [7]	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢	2.45¢				2.985¢		2.74¢	2.65¢
Reinforcing (rail) [7, 16]	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢	2.95¢								
Cold-finished [8]	3.20¢	3.20¢	3.20¢	3.20¢		3.20¢							3.35¢	3.61¢	3.58¢
Alloy, hot-rolled	3.05¢	3.05¢				3.05¢	3.05¢	(Bethlehem, Massillon, Canton—3.05¢)					3.20¢		3.19¢
Alloy, cold-drawn	3.80¢	3.80¢	3.80¢	3.80¢		3.80¢							3.95¢		
PLATE Carbon steel [12]	2.65¢	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢	(Coatesville, Claymont—2.60¢, Geneva, Utah—2.60¢) 2.65¢				3.46¢[14]		2.87¢	2.85¢
Floor plates	3.90¢	3.90¢												4.30¢	4.28¢
Alloy	3.79¢	3.79¢			(Coatesville—4.10¢)									4.01¢	3.895¢
SHAPES, Structural	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢	(Geneva, Utah—2.65¢) (Bethlehem—2.50¢)					3.17¢[18]		2.70¢	2.64¢
SPRING STEEL, C-R 0.26 to 0.40 carbon	3.20¢			3.20¢			(Worcester—3.40¢)								
0.41 to 0.60 carbon	4.70¢			4.70¢			(Worcester—4.90¢)								
0.61 to 0.80 carbon	5.30¢			5.30¢			(Worcester—5.50¢)								
0.81 to 1.00 carbon	6.80¢			6.80¢			(Worcester—7.00¢)								
Over 1.00 carbon	9.10¢			9.10¢			(Worcester—9.30¢)								
MANUFACTURERS' WIRE [9] Bright [10]	3.30¢	3.30¢		3.30¢	3.30¢		(Worcester—3.40¢, Duluth—3.35¢)					5.63¢[13]		3.71¢	3.68¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.25¢	4.25¢		4.25¢		(Worcester—4.35¢, Duluth—4.50¢)				(Trenton—4.50¢)		5.24¢[13]		4.66¢	4.595¢
PILING, Steel sheet	3.00¢	3.00¢				3.00¢								3.41¢	3.36¢

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

Basing Point	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation			Subject to negotiation		
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Watervliet, Syracuse, Balt.	Subject to negotiation			Subject to negotiation		
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Water, Syracuse, Ft. Wayne, Titusville	23.00	22.50	17.50	17.50	21.00	25.50
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville	27.50	26.00	20.50	21.00	24.50	30.00
Bars, c-f, P'gh, Chi, Cleve, Canton, Dunkirk, Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet	27.50	26.00	20.50	21.00	24.50	30.00
Plates, P'gh, Middletown, Canton	31.50	29.50	23.50	24.00	28.00	33.00
Shapes, structural, P'gh, Chi	27.50	26.00	20.50	21.00	24.50	30.00
Sheets, P'gh, Chi, Middletown, Canton, Balt.	39.00	37.00	29.00	31.50	35.50	39.50
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown	25.50	23.50	18.50	19.00	26.00	33.00
Strip, c-r, P'gh, Cleve, Newark, N. J., Reading, Canton, Youngstown	32.50	30.50	24.00	24.50	35.00	56.50
Wire, c-d, Cleve, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J. Phila., Ft. Wayne	27.50	26.00	20.50	21.00	24.50	30.00
Wire, flat, c-r, Cleve, Balt, Reading, Dunkirk, Canton	32.48	30.30	23.80	24.34	34.62	56.26
Rod, h-r, Syracuse	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 to 8 in.)	72.09	72.09	.....	68.49	.....	.....

TOOL STEEL

*(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, Ohio)*

W	Cr	V	Mo	Base per lb
18	4	1	—	74¢
1.5	4	1.5	8	59¢
6	4	2	6	63¢

High-carbon-chromium* ..... 47¢
Oil hardening manganese* ..... 26¢
Special carbon* ..... 24¢
Extra carbon* ..... 20¢
Regular carbon* ..... 16¢

Warehouse prices on and east of Mississippi are 2¢ per lb. higher; west of Mississippi, 4¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	Per lb
Field grade	4.20¢
Armature	4.50¢
Electrical	5.00¢
Motor	5.75¢
Dynamo	6.45¢
Transformer 72	6.95¢
Transformer 65	7.65¢
Transformer 58	8.35¢
Transformer 52	9.15¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb
No. 1 O.H., per 100 lb $2.50
Angle splice bars, 100 lb 3.00
(F.o.b. basing points) *per 100 lb*
Light rails (from billets) $2.85
Light rails (from rail steel), f.o.b. Williamsport, Pa. 2.95

	Base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.80¢
Tie plates, Pacific Coast	2.95¢
Track bolts	6.50¢
Track bolts, heat treated, to rail roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	$6.75	$13.50

CLAD STEEL

Base prices, cents per pound

Stainless-clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Coatesville, Pa.	*24.00	*22.00
Nickel-clad 10 pct, f.o.b. Coatesville, Pa.	31.50	....
Inconel-clad 10 pct, f.o.b. Coatesville	30.00	....
Monel-clad 10 pct, f.o.b. Coatesville	29.00	....
Aluminized steel Hot dip, 20 gage, f.o.b. Pittsburgh	....	9.00

*Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Base per keg	Delivered San Francisco
Standard, galvanized and coated nails	$3.75†	$4.83
Cut nails, carloads, Pittsburgh base	5.30	....

†10¢ additional at Cleveland, 30¢ at Worcester.

	Base per 100 lb	
Annealed fence wire	$3.95‡	$4.96
Annealed galv. fence wire	4.40‡	5.41

‡10¢ additional at Worcester.

To the dealer f.o.b. Pittsburgh, Chicago, Birmingham

	Base column	
Woven wire fence*	84	107
Fence posts, carloads	90††	...
Single loop bale ties	86	110
Galvanized barbed wire**	94	114
Twisted barbless wire	94	...

* 15½ gage and heavier. ** On 80-rod spools in carload quantities. †† Pittsburgh, Duluth.

HIGH STRENGTH, LOW ALLOY STEELS

base prices, cents per pound

Steel	Alde-cor	Corten	Double Strength No. 1	Dyn-alloy	HI Steel	Mayari R	Otis-coloy	Yoloy	Y-50	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill	Great Lakes Steel
Plates	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	....	4.10
Sheets										
Hot-rolled	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	....	3.85
Cold-rolled	4.75	4.75	4.75	....	4.75	4.75	4.75	4.75	5.225*	4.75
Galvanized	....	5.40	....	....	....	5.40	....	....	....	....
Strip										
Hot-rolled	3.85	3.85	3.85	....	3.85	3.85	3.85	3.85	....	3.85
Cold-rolled	....	....	4.75	....	....	4.75	4.75	4.75	5.00*	4.75†
Shapes	....	3.85	....	....	3.85	3.85	3.85	3.85	....	....
Beams	....	3.85	....	....	....	3.85	....	....	....	....
Bars										
Hot-rolled	4.00	4.00	4.00	....	....	4.00	4.00	4.00	....	4.00
Cold-rolled	....	....	....	....	....	....	....	4.60	....	....
Bar shapes	....	4.00	....	....	4.00	4.00	4.00	4.00	....	....

* 21 gage and lighter. † Pittsburgh, add 0.10¢ at Chicago and Gary.

PIPE AND TUBING

Base discounts. F.ob. Pittsburgh and Lorain, steel buttweld and seamless. Others f.o.b. Pittsburgh only

Base price, $200.00 per net ton

Standard, threaded & coupled

Steel, buttweld	Black	Galv.
⅛-in.	55½	41
¼-in.	58½	45
⅜ to 3-in.	60½	47½
Wrought Iron, buttweld		
⅛ in.	2	+20
¼-in.	11½	+10
⅜ and 1¼-in.	17	+ 2
1½-in.	22½	1½
2-in.	23	2
Steel, lapweld		
2-in.	53	39½
2½ and 3-in.	56	42½
3½ to 6-in.	58	44½
Steel, seamless		
2-in.	52	38½
2½ and 3-in.	55	41½
3½ to 6-in.	57	43½
Wrought Iron, lapweld		
2-in.	14½	+ 5½
2½ to 3½-in.	17	+ 1½
4-in.	21	4
4½ to 8-in.	19	2½

Extra Strong, plain ends

Steel, buttweld		
⅛-in.	54½	41½
¼-in.	58½	45½
⅜ to 3-in.	60	48
Wrought Iron, buttweld		
⅛-in.	6½	+14
¼-in.	12½	+ 8
⅜ to 2-in.	22	2
Steel, lapweld		
2-in.	52	39½
2½ and 3-in.	56	43½
3½ to 6-in.	59½	47
Steel, seamless		
2-in.	51	38½
2½ and 3-in.	55	42½
3½ to 6-in.	58½	46
Wrought Iron, lapweld		
2-in.	17½	+ 2
2½ to 4-in.	26	8½
4½ to 6-in.	22	4

Basing discounts for standard pipe are for threads and couplings. For threads only, buttweld, lapweld and seamless pipe, one point higher discount (lower price) applies. For plain ends, buttweld, lapweld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lapweld and seamless 3½-in. and larger four points higher discount (lower price) applies. F.o.b. Gary prices are one point lower discount on all buttweld. On buttweld and lapweld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft, f.o.b. Pittsburgh in carload lots, cut length 4 to 24 ft, inclusive.

O.D. in.	Gage BWG	Seamless Hot-Rolled	Seamless Cold-Drawn	Electric Weld Hot-Rolled	Electric Weld Cold-Drawn
2	13	$15.29	$18.17	$15.00	$17.95
2½	12	20.57	24.43	20.11	24.07
3	12	22.87	27.18	22.26	26.68
3½	11	28.86	34.30	28.06	33.64
4	10	35.82	42.55	34.78	41.68

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in. del'd Chicago	$81.56
6-in. to 24-in. del'd New York	79.80
6-in. to 24-in., Birmingham	71.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles for all rail shipment; rail and water shipment less	95.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
½ in. & smaller x 6 in. & shorter	48
9/16 & ⅝ in. x 6 in. & shorter	50
All larger diam and longer lengths	47
Lag, all diam over 6 in. long	48
Lag, all diam x 6 in. & shorter	50
Plow bolts	57

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

⅛ in. and smaller	48
9/16 to 1 in. inclusive	47
1⅛ to 1½ in. inclusive	45
1⅝ in. and larger	40

On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts

Base discount less case lots

	U.S.S.	S.A.E.
7/16 in. and smaller	....	51
½ in. and smaller	50	..
⅛ in. through 1 in.	....	48
9/16 in. through 1 in.	49	..
1⅛ in. through 1½ in.	47	46
1⅝ in. and larger	40	..

In full case lots, 15 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts separate	65 and 10
In bulk	75

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $5.25
F.o.b. Lebanon, Pa. 5.40

Small Rivets

(7/16 in. and smaller)

Percent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 55 and 5

Cap and Set Screws

(In packages)	*Percent Off List Consumer*
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	56
¾ to 1 in. x 6 in., SAE 1035, heat treated	47
Set screws, cup and oval points	61
Milled studs	33
Flat head cap screws, listed sizes	31
Fillister head cap, listed sizes	40

Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.

FLUORSPAR

Metallurgical grade, f.o.b. producing plant.

Effective CaF₂ Content:	Base price per short ton
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	$5.95
Old range, non-bessemer	5.80
Mesabi, bessemer	5.70
Mesabi, non-bessemer	5.55
High phosphorus	5.55

Prices quoted retroactive to Jan. 1, 1947.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh	24¢ to 28½¢
Copper, electrolytic, 100 and 325 mesh	30¢ to 31½¢
Copper, reduced, 150 and 200 mesh	29¢ to 30½¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe carlots	10¢ to 15¢
Swedish sponge iron, 100 mesh, c.i.f. N. Y., carlots, ocean bags	7.4¢ to 8.5¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots	5¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	66¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe	35¢ to 37¢
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	29¢ to 31¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to $1.75
Aluminum, 100, 200 mesh, carlots	23¢ to 26¢
Antimony, 100 mesh	36.05¢
Cadmium, 100 mesh	$2.00
Chromium, 100 mesh and finer	$1.025
Lead, 100, 200 & 300 mesh	18.50¢ to 23.50¢
Manganese, minus 325 mesh and coarser	49¢
Nickel, 150 mesh	51½¢
Silicon, 100 mesh	26¢
Solder powder, 100 mesh	38½¢ plus m[illegible]
Tin, 100 mesh	90¢
Tungsten metal powder, 98%-99%, any quantity, per lb	$2.90
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb	$2.65
Under 100 lb	$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$10.00 to $11.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	11.00 to 12.00
Foundry, Byproduct	
Chicago, del'd	$16.10
Chicago, f.o.b.	15.10
New England, del'd	17.25
Seaboard, Kearney, N. J., f.o.b.	15.35
Philadelphia, del'd	15.46
Buffalo, del'd	16.14
Ashland, Ohio, f.o.b.	13.35
Painesville, Ohio, f.o.b.	14.60
Erie, del'd	15.75
Cleveland, del'd	15.90
Cincinnati, del'd	15.39
St. Louis, del'd	15.85
Birmingham, del'd	13.25

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads, Per 1000
First quality, Ohio	$64.00
First quality, Pa., Md., Ky., Mo.	70.00
First quality, New Jersey	75.00
Sec. quality, Pa., Md., Ky., Mo.	64.00
Sec. quality, New Jersey	59.00
Sec. quality, Ohio	56.00
Ground fire clay, net ton, bulk	10.00

Silica Brick

Pennsylvania and Birmingham	$70.00
Chicago District	79.00
Silica cement, net ton (Eastern)	12.00
East Chicago	13.00

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$59.00

Magnesite Brick

Standard, Balt. and Chester	$81.00
Chemically bonded, Baltimore	70.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in bulk	$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	24.00
in sacks	28.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. Billmeyer, Pa., Millersville, O.	10.55
Midwest, add 10¢; Mo. Valley, add 20¢	

WAREHOUSE PRICES

Base prices, delivered metropolitan areas, per 100 lb.

CITIES	SHEETS			STRIP		Plates	Standard Structural Shapes	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	$4.14	$5.18	$5.29	$4.43	$5.28	$4.44	$4.22	$4.48	$5.13	$8.37	$8.37	$9.88	$9.88
New York	4.22	5.17[1]	5.47	4.62	5.40	4.62	4.37	4.62	5.17	8.42	8.42	9.92	9.92
Boston	4.40	5.22	4.95[12]	4.85	6.36	4.70	4.47	4.62	5.22	8.62	8.62	9.97	9.97
Baltimore	3.89	....	5.14	4.40	....	4.39	4.34	4.45	5.10	....	....	....	....
Norfolk	4.15	....	....	....	....	4.50	4.50	4.75	5.50	....	....	....	....
Chicago	3.65	....	....	4.05	5.05	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Milwaukee	4.099	4.899[1]	5.249	4.199	....	4.399	4.249	4.249	4.899	8.399	8.399	9.649	9.649
Cleveland	3.95	4.55	5.238	4.188	5.00	4.25†	4.311	4.10	4.75	8.358	8.358	9.35	9.35
Buffalo	3.95	4.65[1]	5.35	4.30	5.25	4.55	4.10	4.10	4.75	8.10	8.10	9.35	9.35
Detroit	4.05	4.85	5.42	4.34	5.24	4.49†	4.42	4.20	4.87	8.51	8.51	9.74	9.74
Cincinnati	3.916	4.716	5.168	....	....	4.553	4.444	4.403	5.053	....	....	....	....
St. Louis	3.999	4.799[1]	5.424	4.199	5.424	4.399	4.249	4.249	5.074	8.574	8.574	9.824	9.824
Pittsburgh	3.95	4.65[1]	5.10	4.05	4.95	4.25	4.10	4.10	4.75	8.10	8.10	9.35	9.35
St. Paul	4.284[7]	5.084[1]	5.434[2]	4.384[7]	....	4.584[7]	4.434[7]	4.434[7]	5.476[6]	....	7.084[6]	....	....
Omaha	4.668	6.118[1]	5.918	4.868	....	5.068	4.918	4.918	5.818	....	....	....	....
Indianapolis	3.84	4.84	5.29	4.24	5.01	4.51	4.36	4.56	5.01	....	....	....	....
Birmingham	3.65[11]	....	5.20	4.00[11]	....	4.30[11]	4.05[11]	4.05[11]	5.58	....	....	....	....
Memphis	4.27	....	5.97	4.72	....	4.92	4.67	4.67	5.78	....	....	....	....
New Orleans	*4.68[11]	5.94[1]	....	4.88[11]	....	5.03[11]	*4.73[11]	*4.83[11]	5.94[6]	....	....	....	....
Los Angeles	5.15	7.00[1]	6.70	5.65	8.35[5]	5.10	5.20	5.10	6.90[14]	10.15	9.35	11.05	11.05
San Francisco	4.70[8]	6.30[9]	6.45	5.20[8]	....	5.00[8]	4.90[8]	4.75[8]	7.00[10]	....	....	....	....
Seattle	4.80[4]	6.75[2]	6.30	5.30[4]	....	5.15[4]	4.95[4]	5.00[4]	7.10[14]	....	9.50[6]	....	10.85[6]
Portland	5.00[4]	....	6.25	5.50[4]	....	5.25[4]	5.10[4]	5.10[4]	7.20	....	9.30[6]	....	....
Salt Lake City	5.65	....	7.10	6.35	....	5.70	5.85	5.95	7.00	....	....	....	....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars 1000 lb and over.

ALLOY BARS: 1000 lb and over.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999; (8) 400 lb and over; (9) 450 to 1499; (10) 500 to 999; (11) 400 to 3999; (12) 450 to 3749; (13) 400 to 1999; (14) 1500 and over.

* Add 46¢ for sizes not rolled in Birmingham.

† Up to ¾ in. thick and 90 in. wide.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	34.00	34.50	35.00	35.50	.....	Boston	Everett	$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro	34.00	34.50	35.00	35.50	39.00	Boston	Birdsboro-Steelton	4.82	.....	.....	.....	.....	43.82
Birmingham	29.38	29.88	.....	.....	.....	Brooklyn	Bethlehem	3.00	37.00	37.50	38.00	38.50	.....
Buffalo	32.50	33.00	33.50	.....	.....	Brooklyn	Birdsboro	3.50	.....	.....	.....	.....	42.50
Chicago	32.50	33.00	33.50	34.00	.....	Cincinnati	Birmingham	4.87	34.25	34.75	.....	.....	.....
Cleveland	32.50	33.00	33.50	.....	.....	Jersey City	Bethlehem	1.84	35.84	36.34	36.84	37.34	.....
Duluth	33.00	33.50	34.00	34.50	.....	Jersey City	Birdsboro	2.33	.....	.....	.....	.....	41.33
Erie	32.50	33.00	33.50	34.00	.....	Los Angeles	Provo	5.94	38.94	39.44	.....	.....	.....
Everett	29.00	29.50	30.00	30.50	.....	Mansfield	Cleveland-Toledo	2.33	34.83	35.33	35.83	36.33	.....
Granite City	32.50	33.50	33.50	.....	.....	Philadelphia	Swedeland	1.01	36.01	36.51	37.01	37.51	.....
Neville Island	33.00	33.50	33.50	34.00	.....	Philadelphia	Birdsboro	1.49	.....	.....	.....	.....	40.49
Provo	33.00	33.50	.....	.....	.....	San Francisco	Provo	5.94	38.94	39.44	.....	.....	.....
Sharpsville	33.00	33.50	33.50	34.00	.....	Seattle	Provo	5.94	38.94	39.44	.....	.....	.....
Steelton	34.00	.....	.....	.....	39.00	St. Louis	Granite City	0.75 Arb.	33.25	34.25	34.25	.....	.....
Struthers, Ohio	33.50	.....	.....	.....	.....								
Swedeland	35.00	35.50	36.00	36.50	.....								
Toledo	32.50	33.00	33.50	34.00	.....								
Troy, N. Y.	34.00	34.50	35.00	35.50	39.00								
Youngstown	33.00	33.50	33.50	34.00	.....								

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00 pct. $2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and $1 per ton extra for each additional 0.25 pct nickel.

Silvery iron silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—$42.50; f.o.b. Buffalo—$43.75. Add $1.00 per ton for each additional 0.50 pct Si, up to 12 pct. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add $1.00 per ton for 0.75 pct or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorous $40.50 per gross ton, f.o.b. Lyles, Tenn. Delivered to Chicago, $45.99. High phosphorous charcoal pig iron is not being produced.

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Less ton lots (packed)	157.00
Delivered Pittsburgh	140.25

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.

	Eastern	Central	Western
Carload, bulk	7.00	7.25	7.80
Ton lots	8.00	8.60	10.50
Less ton lots	8.40	9.00	10.90

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$43.00	$44.00
F.o.b. Pittsburgh	47.00	48.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

	Carloads	Ton	Less
0.06% max. C, 0.06% P, 90% Mn	21.00	22.10	22.70
0.10% max. C	20.50	21.60	22.20
0.15% max. C	20.00	21.10	21.70
0.30% max. C	19.50	20.60	21.20
0.50% max. C	19.00	20.10	20.70
0.75% max. C, 7.00% max. Si	16.00	17.10	17.70

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.65
Ton lots	7.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet	6.75
Ton lots	7.75
Less ton lots	8.15

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, $68.00 f.o.b. Keokuk, Iowa; $67.00 f.o.b. Niagara Falls. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add 50¢ per ton for each 0.50 pct Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots packed.

	Eastern	Central	Western
96% Si, 2% Fe	15.60	17.35	19.60
97% Si, 1% Fe	16.00	18.25	20.00

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si. 1 lb Si briquets.

	Eastern	Central	Western
Carload, bulk	4.25	4.50	4.70
Ton lots	5.25	5.85	6.15
Less ton lots	5.65	6.25	6.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
25% Si	11.65	...	...
50% Si	7.80	8.30	8.50
75% Si	10.00	10.30	11.05
80-90% Si	11.30	11.60	12.35
90-95% Si	12.80	13.10	13.80

Ferrochrome (65-72% *Cr*, 2% *max. Si*)

Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

	Eastern	Central	Western
0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.75	22.15	22.25
0.50% C	21.50	21.90	22.00
1.00% C	21.00	21.40	21.50
2.00% C	20.50	20.90	21.00
65-69% Cr, 4-9% C	15.60	16.00	16.15
62-66% Cr. 4-6% C. 6-9% Si.	16.60	17.00	17.15

Briquets — contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.

	Eastern	Central	Western
Carload, bulk	9.85	10.10	10.20
Ton lots	10.75	11.65	12.25
Less ton lots	11.15	12.05	12.65

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chrominum contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

	Eastern	Central	Western
Carload	16.70	17.10	17.25
Ton lots	17.90	19.20	20.00
Less ton lots	18.60	19.90	20.70

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

	Eastern	Central	Western
Carload	21.00	21.40	21.50
Ton lots	22.35	23.00	24.20
Less ton lots	23.35	24.00	25.20

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed, 97% min. Cr, 1% max. Fe.

	Eastern	Central	Western
0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Calcium—Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.

	Eastern	Central	Western
Carloads	14.00	14.50	16.55
Ton lots	16.10	16.85	19.00
Less ton lots	17.10	17.85	20.00

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.

	Eastern	Central	Western
Carloads	15.50	16.00	18.05
Ton lots	17.60	18.45	20.20
Less ton lots	18.60	19.45	21.20

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1.5¢ for central zone; 3.5¢ for western zone.

	Cast	Turnings	Distilled
Ton lots	$1.60	$2.35	$2.95
Less ton lots	1.95	2.70	3.75

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

	Eastern	Central	Western
Ton lots	16.00	17.10	19.05
Less ton lots	16.75	17.85	19.80

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed. 60-65% Si, 5-7% Mn. 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

	Eastern	Central	Western
Ton lots	14.25	15.35	17.30
Less ton lots	15.00	16.10	18.05

Other Ferroalloys

Ferrotungsten, standard, lump or ¼x down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained W, 5 ton lots, freight allowed... $2.35

Ferrovanadium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.

Openhearth	$3.70
Crucible	$3.80
High speed steel (Primos)	$3.90

Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, per pound contained V_2O_5 $1.10

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb

Ton lots	$2.50
Les ton lots	$2.55

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo ..... 95¢

Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo..... 80¢

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo..... 80¢

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo..... 80¢

Ferrotitanium, 40-45%, 0.10%C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti $1.23

Less ton lots $1.25

Ferrotitanium, 20-25%, 0.10%C max., ton lots, per pound contained Ti $1.35

Less ton lots $1.40

High carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads, per net ton..$142.50

Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. (Siglo) Tenn., $3 unitage per gross ton $65.00

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	17.00¢

Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy

Carload, bulk	5.50¢

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload ..... 6.25¢

Ton lots ..... 6.75¢

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Car lots	9.00¢
Ton lots	9.75¢

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern	Central	Western
Less ton lots	$1.30	$1.3075	$1.329

Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max C.

Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	$2.10	$2.1125	$2.1445

Silcaz, contract basis, f.o.b. plant freight allowed, per pound.

Carload lots	35¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢

Bortram, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

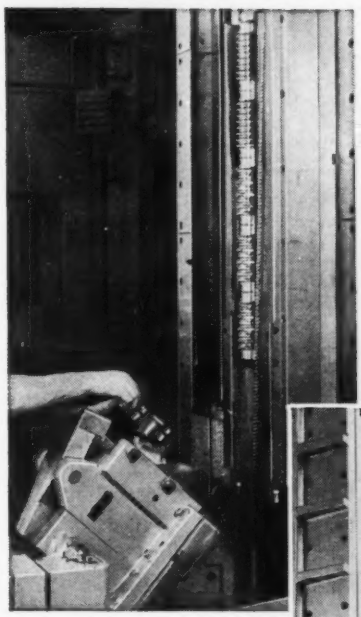
Carbortam, f.o.b., Suspension Bridge, N.Y., freight allowed, Ti 15—17%, B 0.90—1.15%, Si 2.5—3.0%, Al 1.0—2.0%.

Ton lots, per pound	8.0¢

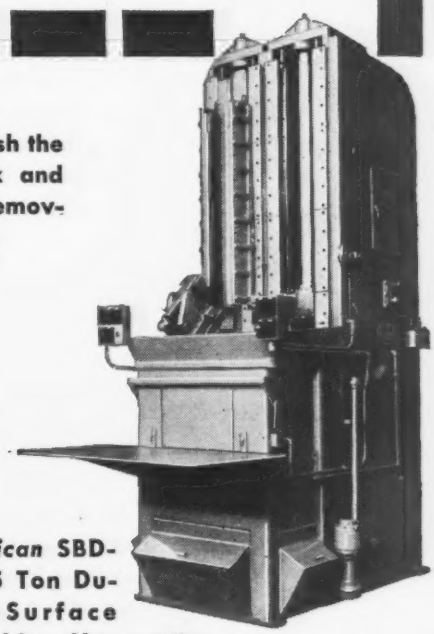
BEARING CAP SETS BROACHED EN BLOC

This *American* Duplex Surface Broaching Machine is tooled up to broach automotive main bearing caps, producing complete sets for 100 motors per hour.

When you are planning metal shaping or finishing work, make use of *American's* complete broaching service—machines, tools, and engineering. You are under no obligation when you SEE *American* FIRST!

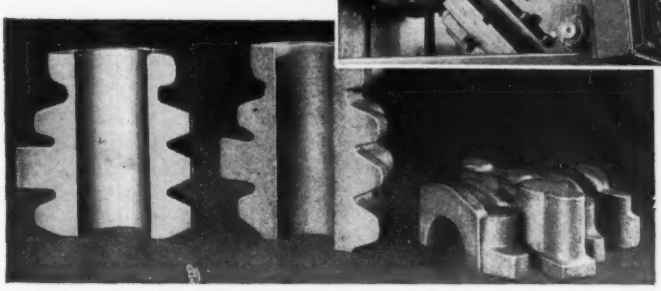


Operation at the left is to finish the joint face and bearing lock and semi-finish the half round, removing ⅛ stock on each surface.



American SBD-66-25 Ton Duplex Surface Broaching Machine with tilting type work tables.

Operation at right straddle broaches the two ends of the casting.



Above: Right to left: 1. The rough casting. 2. Ends straddle broached. 3. Joint face, bearing lock and half round broached.

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DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U.S.A.

Gallup Polls

(CONTINUED FROM PAGE 117)

The next question in the quiz was this:

"How much of a majority is required for the Senate and House to override a Presidential veto?"

The correct answer—a two thirds majority—was given by 44 pct of all voters.

British Aluminum Consumers Merging For New Facilities

London

• • • **A merger of** their respective aluminum subsidiaries with a view to large-scale development has been decided upon by Tube Investments, Ltd., and Hawker Siddeley Aircraft Co., Ltd. Plans include the laying out of a rolling mill to produce aluminum sheet and strip. Hawker Siddeley is a holding company with $24,000,000 capital. Its light metal interests are centered in High Duty Alloys, Ltd., aluminum alloy manufacturers and founders, of Slough, Buckinghamshire.

Tube Investments, Ltd., with a capital of some $17,200,000, has its holdings mostly in steel tube manufacturing concerns. Its aluminum interests are in Reynolds Tube Co., Ltd., and Reynolds Rolling Mills, Ltd., both of Birmingham, the former making aluminum alloy tubes and rods, bars and extruded sections, and the latter sheet and strip.

High Duty Alloys are already interested in Reynolds Rolling Mills. The merger will be effected by means of a holding company, in which each group will have an equal share, to take over the share capital of the subsidiary companies concerned of both groups. Upward of $20,000,000 will be involved in the new company.

Both Tube Investments and Hawker Siddeley are big users of aluminum. The consuming side of their activities will be unaffected by the merger. On the manufacturing side their respective aluminum subsidiaries have for some time had a working arrangement. The new plan aims at formalizing the arrangement and securing better products in larger quantities by pooling technical resources and building new fabricating facilities.

Seven Divisions Of Foundrymen's Group Elect New Chairmen

Chicago

• • • **Seven divisions** of the Amerman Foundrymen's Assn. have elected chairmen and vice-chairmen for 1947-49. These divisions include brass and bronze, educational, gray iron, malleable, pattern, sand and steel.

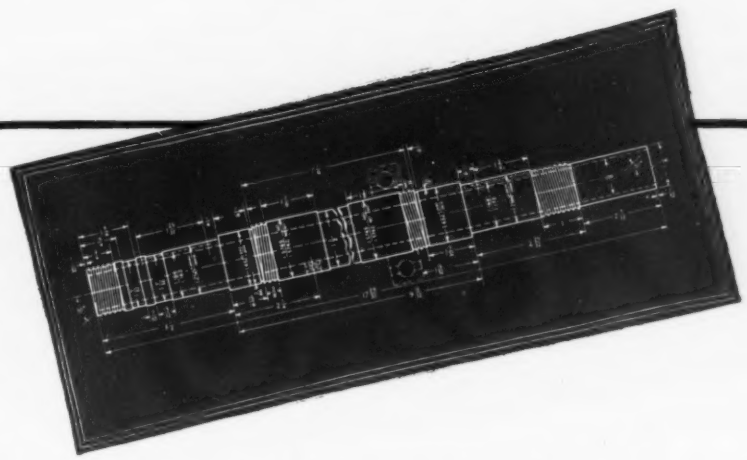
Brass and Bronze: Walter W. Edens has been elected chairman. Mr. Edens first joined Heil Co. and later became chief metallurgist and technical director of Ampco Metal Inc., Milwaukee. He was vice-chairman of the brass and bronze division and headed the program and papers committee. Mr. Edens is also a director of the association's Wisconsin chapter. George P. Halliwell has been elected vice-chairman of the brass and bronze division. Mr. Halliwell was first connected with the Bridgeport Brass Co. and then with Westinghouse Electric & Mfg. Co. He is now associated with H. Kramer & Co., Chicago, as director of research. Mr. Halliwell has served on the research committee of AFA's brass and bronze division, and is vice-chairman of the program and papers group.

Walter W. Edens

Educational: Fred G. Sefing has been named chairman. His background includes association with Hudson Motor Car Co., Rockford Drop Forge Co., Pennsylvania State College and Michigan State College. He is now a research metallurgist with International Nickel Co., New York. Mr. Sefing is a member of the gray iron division advisory group and a past chairman of the association's Metropolitan chapter. Alfred W. Gregg, who was elected vice-chairman of the educational

Fred G. Sefing

The Steel Tube "Headache" that Multiplies Itself



Courtesy Petroleum Heat & Power Co.

TO MAKE this "Petro" oil burner shaft, a seamless steel tube is turned and ground to 17 separate diameters. It's threaded, tapped, chamfered and keywayed—all to close tolerances.

The cost of making this finely balanced shaft (8 times that of the raw material) makes rejection of a finished part highly expensive. Hours of skilled labor might be spent on material later found defective—while the cost headache multiplies with every wasted man hour.

Frasse tubing has been successfully used by the manufacturer in this rigid application for years. If you're interested in cost reducing (and who isn't these days) you'll find tubing of the selfsame quality in any Frasse warehouse.

Frasse stocks include seamless and welded mechanical tubing, aircraft, condenser and pressure tubing, and stainless steel tubing and pipe. Complete range of sizes and grades to choose from—shipment made overnight. Call us. *Peter A. Frasse and Co., Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Radcliff 5-7100) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) Jersey City • Syracuse • Hartford • Rochester • Baltimore*

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division, has been associated with Latrobe Steel Co., Bucyrus-Erie Co., Bonney-Floyd Co. and is now technical assistant to the president of Whiting Corp., Harvey, Ill. Mr. Gregg is vice-chairman and head of the program and papers committee of AFA's educational division and is a member of the steel division executive committee.

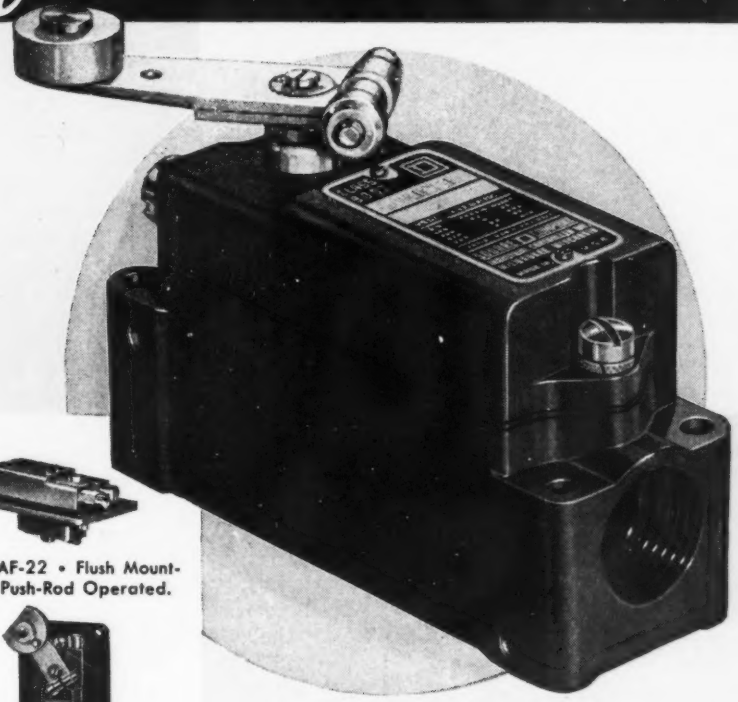
Gray Iron: Russell J. Allen, metallurgical engineer, Worthington Pump & Machinery Corp., Harrison, N. J., has been elected chairman. He was formerly associated with Rolls - Royce of America, Inc. as metallurgist. For the past 2 years he has been gray iron division vice-chairman and program and committee head, as well as chairman of the committee on high temperature properties of cast iron. R. G. McElwee, foundry alloy division manager, Vanadium Corp. of America, Detroit, was elected vice-chairman of the gray iron division. He was formerly with Muncie Foundry & Machine Co., General Motors Truck Co., American Car & Foundry Co., Whitehead & Kales Co. and Ecorse Foundry Co. Mr. McElwee is chairman of AFA's cupola research committee and has served on the gray iron division executive committee and as vice-chairman of the program and papers committee.

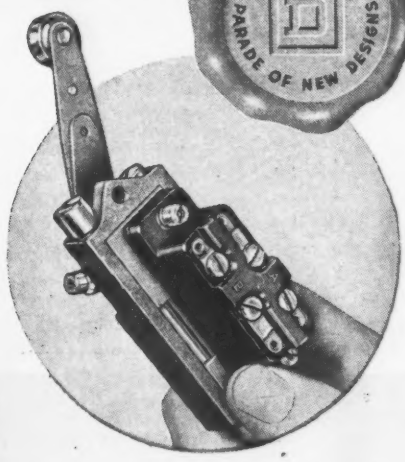
Russell J. Allen

Malleable: Leon J. Wise, assistant to the president, Chicago Malleable Castings Co., Chicago, was elected chairman. He has been connected with National Malleable & Steel Castings Co., Muncie Malleable Foundry Co. and Terre Haute Malleable Mfg. Corp. Mr. Wise is past chairman of the Chicago chapter of AFA and has served recently on the malleable division executive group. William B. McFerrin, who was elected vice-chairman of the malleable division, is metallurgist and

Leon J. Wise

Square D's *Precision Snap Switch* in oil-tight limit switch enclosures *for Machine Tool Applications*





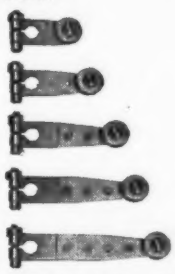
At left—Surface mounted, lever operated Class 9007, Type AW-12 limit switch.

Above—Cover of limit switch removed to show mounting of precision snap switch and four terminal posts.

TYPE AF-22 • Flush Mounting • Push-Rod Operated.

TYPE AF-12 • Flush Mounting • Lever Operated.

TYPE AW-22 • Surface Mounting • Push-Rod Operated.

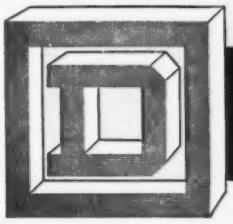


OPERATING ARMS • Available with ⅜" to ¼" Standard Roller or Special Rollers.

The New Limit Switch is a "natural" for machine tool applications. Completely oil-tight, gasketed, die-cast enclosure • Mechanism requires only 5° travel to trip and provides 25° overtravel • Operating arms adjustable to any position around a circle and available in five lengths • One-way and other special rollers available • Return springs easily reversed for either clockwise or counter-clockwise lever operation or removed for maintained contact action • Surface and flush mounting arrangements with either roller arm or push rod operated mechanisms meet virtually any mounting and application requirement • Box of surface mounted arrangement can be rotated to provide conduit entrance at either end of switch.

The Precision Snap Switch operating mechanism consisting of only two alloy leaf springs has no dead center position and gives exceptionally long life • Stainless steel compression return spring insures positive operation and reliable service • Husky highly arc resistant melamine case • Heavy contact blade separate from operating mechanism • Terminals, suitable for No. 14 wire • Separate normally open and normally closed circuits have double break silver contacts.

Write **Square D Company, 4041 N. Richards St., Milwaukee 12, Wisconsin.**
Or ask your nearby Square D Field Engineer to show you a sample.



SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

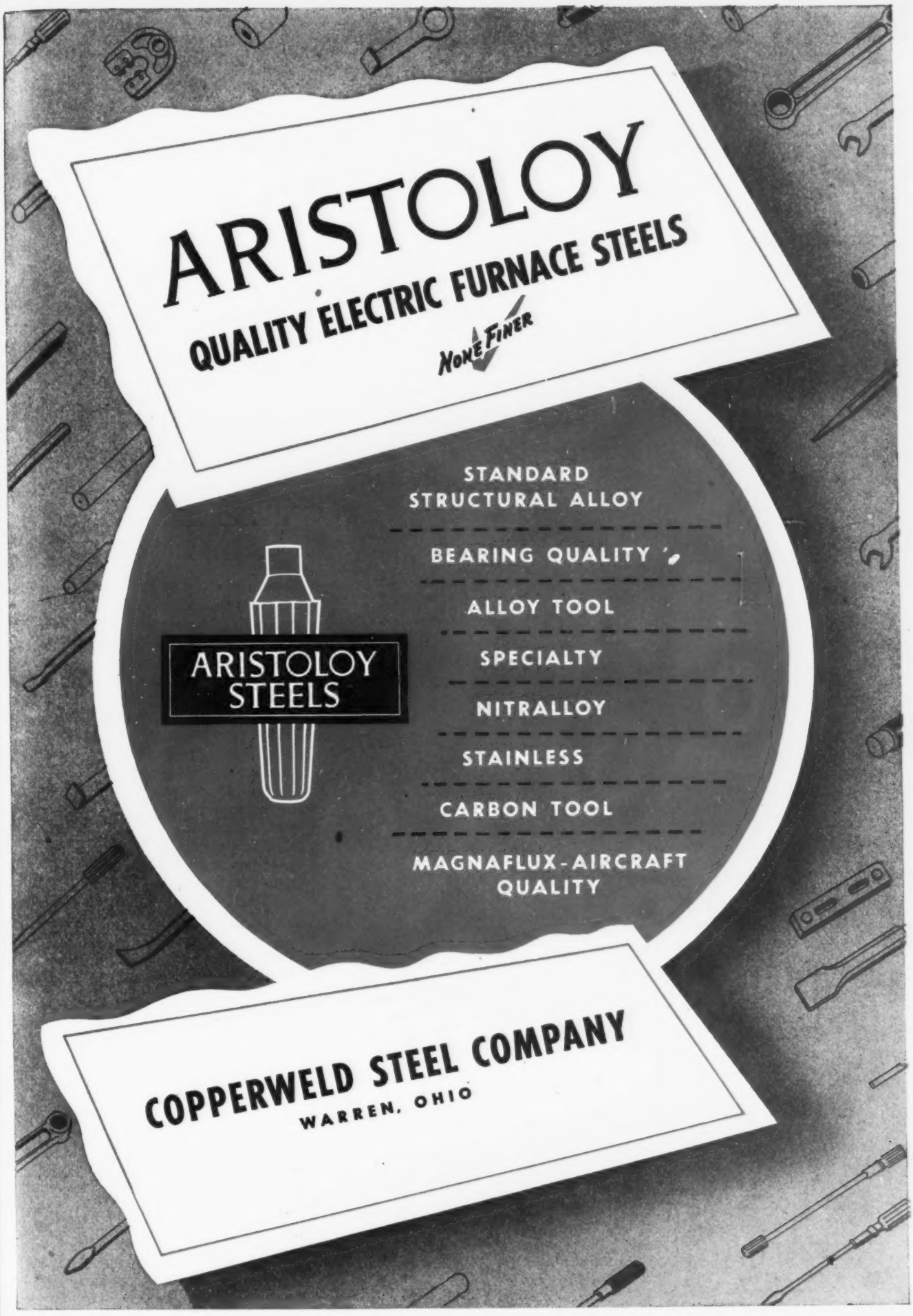
district service manager of Electro Metallurgical Co., Detroit. He was associated with Cadillac Motor Car Co. as foundry chemist, foundry metallurgist and foreman of melting. He is the present vice-chairman and program and papers committee head of AFA's malleable division, as well as co-chairman of the analysis of casting defects committee and member of the chill test group.

Pattern: Albert F. Pfeiffer, assistant general superintendent, Allis-Chalmers Mfg. Co., Milwaukee, has been elected chairman. Mr. Pfeiffer first joined Allis - Chalmers at Scranton and later transferred to the West Allis, Wis., plant, where he has been located since. For the past 2 years he has been vice-chairman of AFA's pattern division and program and papers committee head. He is also a director of the association's Wisconsin chapter. Leonard F. Tucker, president, City Pattern & Foundry Co., South Bend, Ind. was elected vice-chairman of the pattern division. Mr. Tucker started with Studebaker Corp. and in 1935 organized his own firm in South Bend. He has served as a member of the pattern division executive committee for the past 2 years. Mr. Tucker is affiliated with the Michiana chapter of AFA.

Albert F. Pfeiffer

Sand: Dr. H. Ries, Ithaca, N. Y., has been elected chairman. He was an instructor at Cornell University and headed the geology department there. A past director of AFA, Dr. Ries has also served as technical director of the association's committee on molding sand research, chairman of the sand research project and head of many groups involved in that study. Peter E. Kyle, who was elected vice-chairman of the sand division, was formerly assistant professor of mechani-

Dr. H. Ries


ARISTOLOY
QUALITY ELECTRIC FURNACE STEELS
NONE FINER
STANDARD STRUCTURAL ALLOY
BEARING QUALITY
ALLOY TOOL
SPECIALTY
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cal engineering at M.I.T. and later associate professor. In 1946 he joined the faculty of Cornell University as professor of applied metallurgy. With the AFA he has been chairman of the course committee of the cooperation with engineering schools group, head of the flowability of molding sand subcommittee and other sand-investigating bodies.

Steel: Laurence H. Hahn, metallurgical supervisor, Sivyer Steel Casting Co., Chicago, was elected chairman. He first started with Sivyer Steel at Milwaukee and then transferred to the firm's Chicago plant as metallurgist. He was later named metallurgical supervisor there and melting superintendent for both plants. He was president of the Chicago chapter and has also served as a director and vice-president. Charles Locke, chief metallurgist, West Michigan Steel Foundry Co., Muskegon, Mich., was elected vice-chairman of the Steel division. He was first connected with Dodge Steel Foundry and then with West Michigan Steel Foundry, where recently he was given the additional duties of general superintendent. A member of the AFA steel division's committee on methods of producing steel for castings, Mr. Locke has also served as program chairman for the Western Michigan chapter.

Laurence H. Hahn

Firm Buys Surplus Plant

Washington

• • • **The Structural Steel & Forge Co.**, Salt Lake City, has purchased a surplus calcium tungstate plant, operated during the war by the U. S. Vanadium Corp., for $81,400, according to WAA.

The new owners will use the facilities to expand its production of materials needed in the housing and building industries. Availability of raw materials from the neighboring Geneva steel plant will enable the company to enlarge activities so that the payroll will increase from 80 to 130 workers. At a later date, the company expects to erect a new plant.

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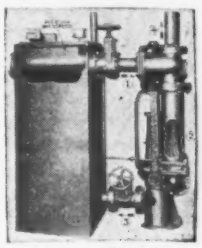

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Negotiates Sale For Pumping and Drilling Equipment to Russia

Cleveland

• • • **Dresser Industries,** Inc., Cleveland, has orders from the Russian Government for eight deep-drilling rigs, 26 portable drilling rigs, 10 portable clean-out rigs, over 100 pumping units, a liquid methane plant, and various other miscellaneous equipment, it was announced by J. B. O'Connor, executive vice-president of Dresser, who just returned to this country after 8 weeks spent in Moscow negotiating the sale.

The deep-drilling rigs, made by International Derrick & Equipment, one of the Dresser member companies, are capable of drilling to 15,000 ft. These rigs will be used in the fields between the Volga and the Urals in the District of Kuibysheve.

The rambler rigs, with portable equipment capable of drilling to 6000 ft; the clean-out rigs, capable of operating to 9000 ft, and the pumping units—all three likewise Ideco products—will be put to work for rehabilitation purposes in the Maikop Field that was practically destroyed during the war.

"The Russian program of petroleum and gas rehabilitation and development, which is part of the current 5-year plan, is a really stupendous undertaking," Mr. O'Connor reports. "To understand it, one must bear in mind that the Russian program embraces plans for the entire nation; that it is much larger in its potentialities than would be a similar program conducted by any one company in the United States, and that eventual possibilities are unlimited because of the vast reserves of crude which as yet have hardly been tapped.

"In carrying out this program the Russians are using the finest and most modern type of equipment. I talked with top technicians in the production, refining, natural gas, and other divisions of the program who are truly experts in their fields and who uniformly possess an almost unbelievable capacity for a hard day's work. It was interesting that many of them had in past years spent some time in the United States and in fact I had first become acquainted with many of

them upon their visits to the States in prewar years.

"As an example of modernization, in their cracking units they are now replacing pumps of the horizontal reciprocating type by those of the centrifugal hot oil type.

"The Russians are determined to rehabilitate the fields destroyed by the war by clean-out, repair and new drilling. In addition, they intend to develop new fields by deep-drilling methods just as modern as those employed in our own country.

"Of particular interest is the natural gas pipe line running between Saratov and Moscow. Moscow is not only a metropolis—it is a big industrial center. It is expected that the increased supply of natural gas to Moscow will relieve pressure on the railroads that are now overtaxed by carrying peat, lignite, and fuel oil.

"I inspected this pipe line. It is a good job. A compressor station on this line which I visited is not only up to the latest American technical standards but is designed furthermore to operate in temperatures as low as 40° below zero.

"This is the line which will be served by the liquid methane plant to be designed and installed by the Stacey-Dresser Engineering Div. of Stacey Bros. Gas Construction Co., another one of the Dresser member companies. This plant will handle storage of liquefied natural gas for stand-by and peak-load purposes."

Canadian Copper And Nickel Production Gain

Ottawa

• • • **Canadian production of copper and nickel moved up sharply in March. During March copper production totaled 20,648 tons against 14,698 tons in February and 16,173 tons in March, 1946. Copper exports for March amounted to 2526 tons in ore concentrate and matte and 6280 tons in ingots, bars, slabs and billets.**

Nickel production in March amounted to 10,014 tons compared with 8522 tons in February and 7839 tons in March last year. Nickel exports during March totaled 10,526 tons.

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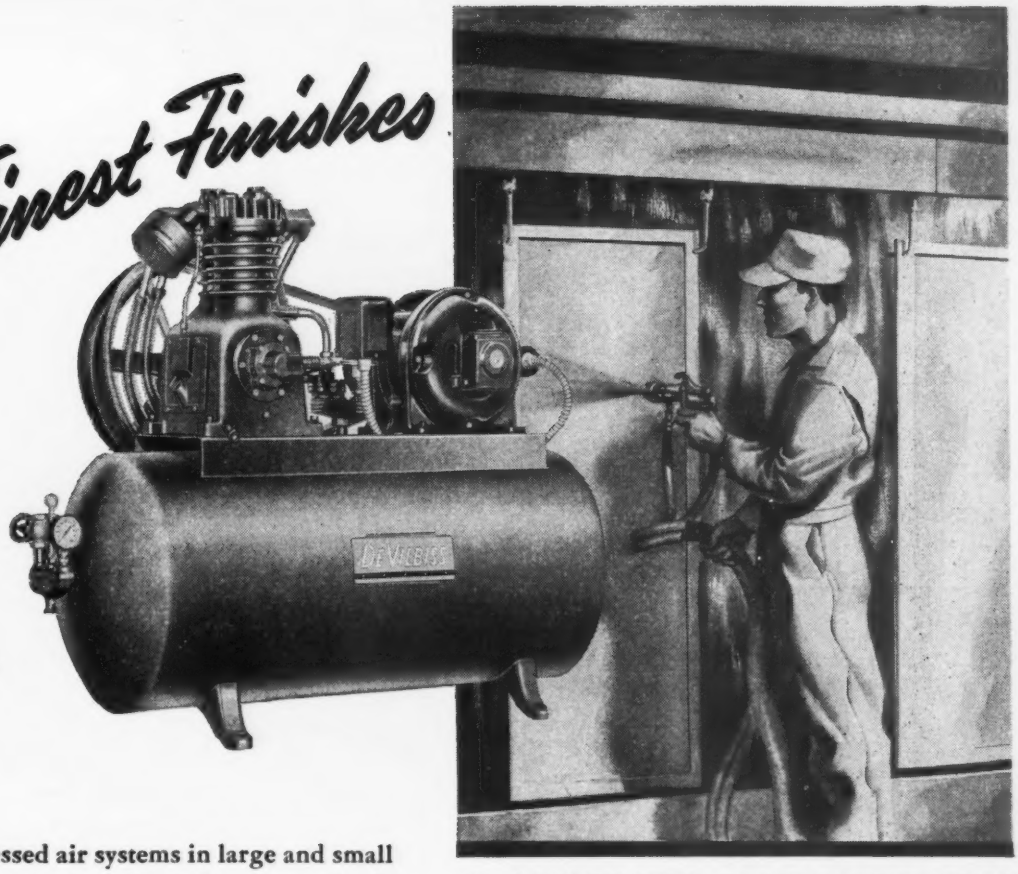

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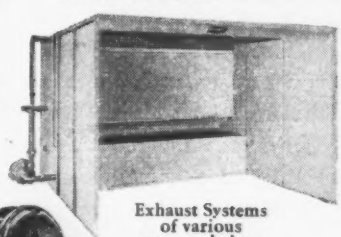

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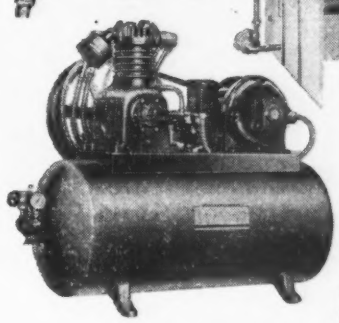

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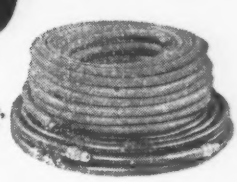

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Can Co. Vice-President Sees Adequate Tinplate Supply for Year 1948

New York

• • • **Adequate supplies of tinplate**—the result of increased mill capacity—together with the higher level of demand for metal containers—combine to give can manufacturing a bright outlook for 1948, W. C. Stolk, vice-president of American Can Co., told the National Association of Purchasing Agents at their recent meeting in the Waldorf-Astoria.

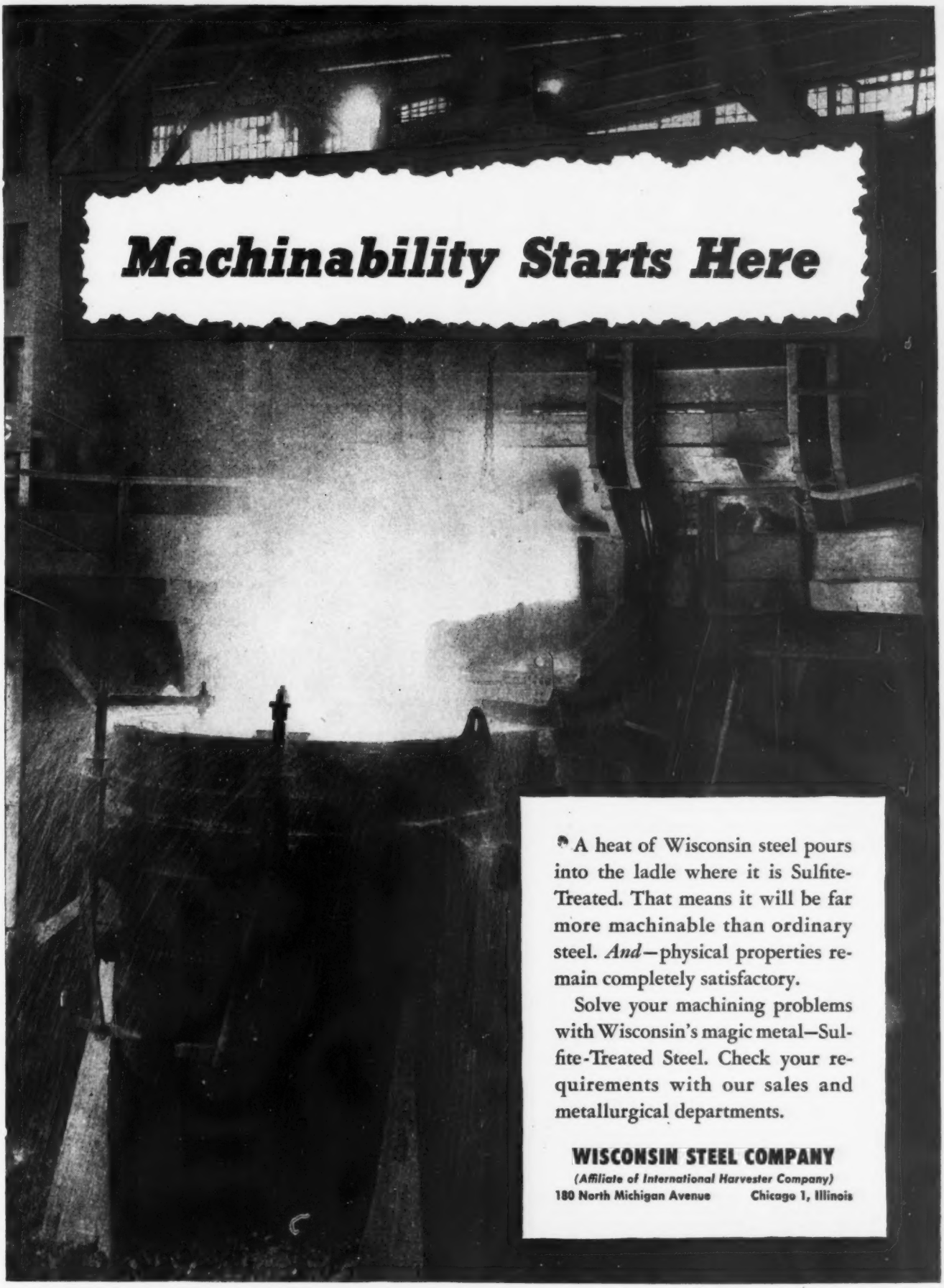
"As far as we can see," said Mr. Stolk, "there should be no scarcity of steel next year. New mills for the production of tinplate now being installed will increase the production of tin and black plate by 25 to 33 1/3 pct. I hope, and believe, the increased demand for metal containers will enable the can industry to utilize this increase in plate production."

Though empty pipe lines for some canned products are being filled even more rapidly than anticipated, demand is continuing at a heavy pace for those products which were under metal restrictions during and immediately following the war, he said. Actual requirements of metal container users are in approximate balance with anticipated 1947 plate receipts, Mr. Stolk added.

Explaining that the metal container industry is unique in that the greater part of its volume is sold under contracts by which the supplier commits to fill all requirements of the buyer. Mr. Stolk praised the requirement contract as being "the best safeguard against the extreme of either a sellers' or a buyers' market."

"Under such a contract," he stated, "price increases or decreases are possible only through annual fluctuations in the cost of tinplate and labor. It serves as insurance against the greed that often prevails during a sellers' market and the chiseling tactics that are sometimes prevalent in a buyers' market."

All business, said Mr. Stolk, is tired of the sellers' market that has prevailed over the past few years. As a sales manager, Mr. Stolk's chief dislike of the sellers' market is "that it destroys the efficiency of a sales organization." he told the purchasing agent audience. But the



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buyers' market will bring disadvantages, too, he warned, "because there is always the temptation to sacrifice principle to expediency. It is easily forgotten that nobody has ever made a thing so bad that someone else couldn't do it worse and sell it for less."

Ryerson "Opens House" To 4000 at Los Angeles

Los Angeles

• • • **Visitors estimated to number** about 4000 persons attended the open house held recently at the Los Angeles plant of Joseph T. Ryerson & Son, Inc., steel distributors. Hosts were F. A. Purdy, plant manager, and T. L. Kishbaugh, assistant manager The new plant has been in operation since October, 1946.

Before dinner, which has served in a holiday-like atmosphere in dining cars and in a large, gaily decorated tent adjacent to the warehouse building, visitors toured the general offices and warehouses where members of the Ryerson organization were stationed to explain the company's methods of order handling, dispatching, storing, cutting and shipping steel.

Everett D. Graff, president, Harold B. Ressler vice-president and general manager of sales, Ainslie Y. Sawyer, vice-president, William Seymour, Jr., assistant vice-president, and Thomas Z. Hayward, assistant general manager of sales, were among the Ryerson executives who were on hand to welcome guests.

The Los Angeles plant, twelfth in the Ryerson nation-wide system and said to be one of the most modern of its kind in the country, is the first to be placed in operation on the West Coast. The warehouse building covers an area of some 200,000 sq ft. It was engineered and designed to provide maximum efficiency in all operations involved in receiving, stocking, and shipping hot-rolled, cold-finished, reinforcing and specialty steels.

PRESS FORGING

ON THE PRODUCTION LINE BASIS

Photographs courtesy Reed Roller Bit Company, Houston, Texas.

THE dependable performance and high production of Ajax High Speed Forging Presses has led to their installation for turning out forgings on a production line basis. In conjunction with rotary or pusher type furnaces, the heated blank is carried by conveyor through a hydraulic descaler and delivered to the die space of the Ajax Press. The operator handles it through the several forging die impressions and passes it to a second conveyor at the rear, which delivers it to the trimming press operator. After trimming, what was a round-cornered-square blank less than a minute before, emerges as a finished forging. Ajax High Speed Forging Presses are built in nine sizes from 500 to 6000 tons capacities. All incorporate basic construction features which give them the dependable performance so essential to successful operation of a production line.

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DEWART BUILDING NEW LONDON, CONN.

The Disco Co. Plans To Build a $3 Million Smokeless Fuel Plant

Pittsburgh

• • • **The Disco Co.**, subsidiary of Pittsburgh Consolidation Coal Co., plans to build a $3 million plant at McDonald, Pa., for the manufacture of smokeless solid fuel produced from coal fines and marketed under the trade name of "Disco." Included in the plant will be a tar refinery for recovery of coal tar chemicals. Construction is to begin immediately and production from the new commercial plant is expected by October 1948.

The new plant will be equipped with seven unit carbonizers with a total daily production capacity, under present operating practice, of 750 tons of Disco and will process about 1000 tons of high volatile coal as the raw material. The present Disco plant, containing three production units of smaller capacity, will continue producing its monthly average of 6000 tons of this low temperature coke until the new plant is ready to begin operations, at which time the older facilities will be dismantled.

In addition to the low temperature coke, the process produces as byproducts tar, light oil, liquor and gas. The light oil is not presently recovered but is burned with the gas, and no effort is made to recover commercial products from the liquors. The tar is passed through a tar refinery for the recovery of the following four primary tar products:

(1) Tar-acid oil, used extensively for making disinfectants, metal cleaning compounds and reagents for purifying minerals by froth flotation. Production will be over 1,400,000 gal annually.

(2) Creosote oil, used as a preservative for railroad ties and other wood products. Estimated annual production will be 1,250,000 gal.

(3) Fuel pitch, used by steel mills and others as an industrial fuel. Annual production, 950,000 gal.

(4) Pitch coke, a granular coke product used principally in the manufacture of activated carbons. The yield will be some 5000 tons per year.

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P&H "fishbelly" girder in upside-down welding position. Note the alternating full-depth diaphragms, which are hand welded to web and cover plates.

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British Expansion Plan

(CONTINUED FROM PAGE 123)

the country's economy to be reflected even more violently in steel production has created special difficulties for the steel industry in view of the high ratio of fixed capital to turnover.

In considering the future demand for steel an attempt was made to analyze the steel consumption by the main consuming industries. It has always been difficult to secure reasonably accurate figures on this subject and prior to the war no comprehensive information was published in Britain. There is, however, a basis for estimating industrial consumption fairly closely in the Census of Production Report for 1935 which gives considerable detail and covers approximately 90 pct of the total steel deliveries in the U.K. On the basis of these figures and of partial information yielded by the Census of Production for 1924, 1930 and 1937, estimates of steel consumption by the main using industries were made.

The steel allocation arrangements instituted in England during the war and still in operation do not enable reasonably comparable current figures to be obtained for steel consumption on an industry basis. These arrangements were originally based on allocations to government departments in the light of their respective requirements of end products for war purposes.

TABLE I

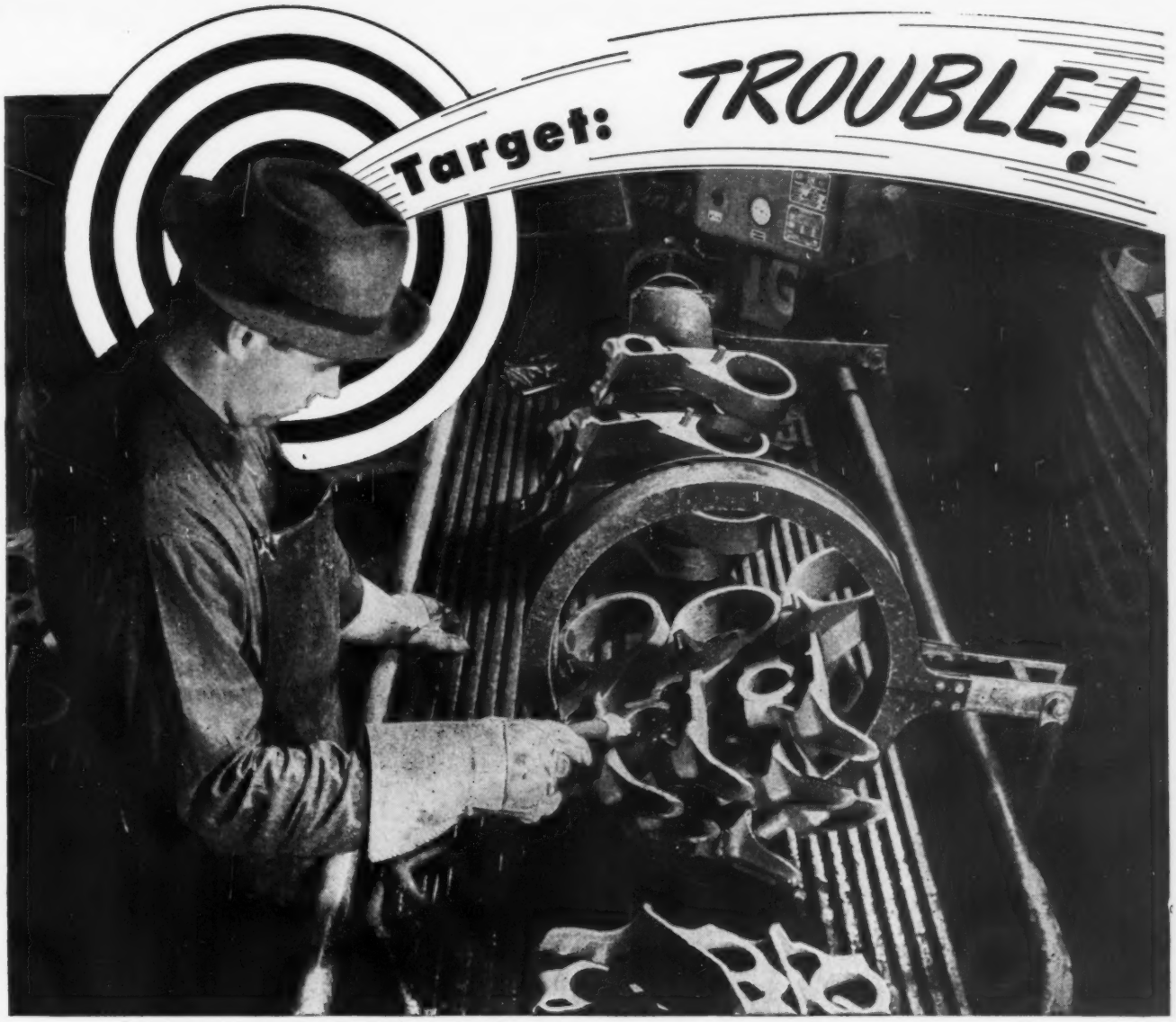
Estimated Steel Consumption* per Head Of The Population in Certain Countries

(*Ingot lbs.*)

	1914	1929	1932	1935	1937
U. K.	307	411	245	409	550
U. S. A.....	504	992	242	581	805
†Germany ...	395	379	132	431	509
‡France	124	414	247	224	300
Belg.-Lux. ...	...	453	249	235	366
U. S. S. R.....	...	87	95	184	237
§Japan	44	137	97	162	220

*Steel available for Home Consumption.
†The figures include the Saar for all years, but otherwise refer to post 1920 frontiers except for 1914.
‡Includes Alsace-Lorraine except for 1914.
§Home islands only.

In forecasting the future steel requirement, Mr. Schone deemed it best to consider the probable trend of demand for each of the



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consuming industries rather than work on the government department classification. In total, a home requirement of 9¾ million long tons of finished steel has been arrived at, or about 13 million long ingot tons.

This estimate of 13 million tons compares with deliveries in 1946 of 11,132,000 ingot tons. During the course of 1946, however, as reconversion of using industries neared completion, requirements rose and in the fourth quarter of 1946 steel was being delivered at the rate of 12¾ million long tons per annum.

Mr. Schone estimated that with the existing labor force in the British metal consuming industries "the trend of consumption would have continued upwards during 1947 and over 13 million tons would have been required for home consumption." Government officials concerned with steel allocations consider this to be a conservative estimate—he could have as easily said over 14 million long tons.

In part, the high demand envisaged in 1947 is due to wartime arrears and may not be a good guide to the more permanent level of steel requirements when these arrears have been worked off.

The year 1937 is probably the best single year on which to base considerations of the future pattern of demand.

In relation to 1937 it appears reasonable to estimate increases in mechanical and electrical engineering and in the motor and cycle and the aircraft industries, on the grounds of the contribution which these industries will be required to make in the future to increase exports.

Although in certain directions substitutes may well be found for steel, there is also likely, compared with 1937, to be some maintenance of the present substitution of steel for other materials. While no doubt some of these anticipations will be falsified by events, taken overall they appear to justify the assumption that home demand will reach a level requiring an ingot production of 13 million tons.

He further stated that in projecting forward trends regard must be had to the fact that in the decade 1950 to 1960 population in Britain is expected to reach its peak and commence to decline. The impact of this stability and

subsequent decline on the capital goods industries is an important factor likely to moderate the extent of increases in steel demand. For a number of years, however, the effect of this factor may be largely offset by the maintenance of employment at a higher level than before the war.

Future direct exports of steel have been estimated at an average of 3 million ingot tons a year. They fluctuated widely in the inter-war period, the average over the 10 years prior to the war being 2½ million ingot tons.

Table II compares production in 1937, which was generally the year of greatest prewar production, with the highest level of production since reached in a number of countries which were important markets for British steel prewar.

On balance it appears unwise to budget on a very substantial expansion of direct steel exports, particularly under conditions in which British coal prices, now the major single cost factor in steel production, have increased relatively out of line with American coal. The estimate of 3 million ingot tons represents an increase of 51 pct on the 1938 exports of 1,985,000 ingot tons.

In addition it may be possible to increase further the proportion of higher valued products in steel exports. Already exports of alloy steel bars and rods in 1946 were 17,577 tons, nearly four times the 1938 figure. Moreover in the Steel Development Plan, special attention is being given to expansion of tube production in order to meet heavy export demands and to developments in other steel finishing trades, for example, in tinplates and tires, wheels and axles, where the product is of high value and the proportion of exports substantial.

Approval in detail has been given to schemes totaling approximately $360 million and on these it has been possible to make

TABLE II

Production of Steel Ingots and Castings

(in thousands of tons)

	1937	Peak Production
Canada	1,403	2,777 (1942)
Australia	1,169[1]	1,700 (1942)[2]
India	895	1,402 (1943)
South Africa	332	525 (1945)
Brazil	72	420 (1946)[3]

[1] Year ended June 30th, 1938.
[2] Year ended June 30th, 1942.
[3] Annual rate based on production August-October 1946.

a start and they are in varying stages of progress at the present time. Certain further plans have been generally approved by the board, but there are still problems connected which are preventing a definite start being made. With these the total passed by the Board amounts to approximately $500 million. The balance of the plans submitted are still under consideration by the board.

Since most of the major programs will take approximately 3 years to complete, the amount of new construction already completed is necessarily small.

On the steel furnace side, new building totaling 4,148,000 tons has been submitted for approval by the Iron and Steel Board as against the total in the original plan of 5,835,000 tons.

In addition, arrangements have been made to convert approximately one third of the steel furnace capacity at present using producer coal to the use of liquid fuel. This will in general contribute to increased output from the plants as some offset to the increased cost of firing with fuel oil. The main use of coal in the

Among the main plans already approved is the new steel works at Margam in South Wales with steel furnaces designed to supply the new continuous strip mill, which will produce approximately 1 million tons a year of wide coiled strip as a basis for further continuous cold rolling into tinplate and sheet. Site preparation work has already started here and the first new blast furnace in connection with this plant came into operation at the end of 1946.

The plan for a new steelworks at Dorman Longs on the North East Coast has also been approved. This plant incorporates a universal beam mill to produce broad flange beams which will effect important economics in the weight of steel involved in structural work. Mr. Schone made no comment to explain why this project has not yet been started.

In Lincolnshire, extensions to the steel melting shop at Lysaghts have been approved, together with the plan for the laying down of a modern continuous billet mill producing 450,000 tons of billets a year. Considerable progress has already been made, both on the steel furnace and blast furnace side, in expanding production in preparation for the installation of the new mill. A new melting shop at the Appleby-Frodingham works has been approved and construction is well advanced so that it should come into operation by the end of 1947. The modernization of the heavy section mills at these same works is also proceeding.

The rebuilding and enlarging of the Round Oak Works, based essentially on the scrap arising in the Birmingham area, has already been started. A plan is under consideration by the board for the rebuilding and enlarging of the steelworks, associated with the Summers' continuous strip mill for sheet production at Shotton.

The areas in which major programs have still to be submitted are for the further rebuilding of steel plant in the North East Coast area as a basis for continuous billet production, and the extension of blast furnace and steel furnace capacity in Scotland. In both these cases plans have not the same urgency as certain of the other districts. Production of billets on the North East Coast is already carried out in specialized plant, giving many of the benefits of large scale production.

Plans approved include the extensions in South Wales in connection with the new South Wales Steelworks, the building of enlarged new furnaces at Lysaghts in Lincolnshire and the addition of two new large blast furnaces at the Appleby-Frodingham Works of the United Steel Companies to replace smaller units. These will be added to the two large modern furnaces completed at Appleby in 1939 and provide a 4-furnace unit.

A third furnace has been approved at Consett on the North East Coast which will be additional to the first modern furnace completed in 1942 and the second furnace which is expected to come into operation during the course of 1947. A third furnace is also being built at the Clyde Ironworks in Scotland which will enlarge the two-furnace plant completed at the beginning of the war. Blast furnace developments at Corby are associated with the new steelworks extensions.

The main plans still to be submitted are those for the expansion of pig iron production in Scotland and for the building of blast furnaces at the Shotton Works to replace and increase the supplies at

present drawn from the Midland area. A major modernization of the blast furnaces on the North East Coast was also envisaged in the original plan.

In the case of billet mills, two plans for development on home ore fields, in Lincolnshire and Northamptonshire, have been approved.

A plan for the building of a new 4-high plate mill, together with the concentration of the production at the Consett works on plates, has been submitted but not yet approved for immediate construction.

Proposals covering the main developments in the heavier section mills are well advanced. Modernization at the Appleby-Frodingham Works in Lincolnshire is proceeding. Modernization of the mills at the Round Oak Company, Birmingham, on medium sections is already under way. The scheme for the broad flange beam mill on the North East Coast, which is much the most important scheme in connection with the modernization of the production of heavy structural material has also been approved.

In the case of sheet and tinplates, the developments already referred to both in South Wales and Shotton have been approved. In the lighter mills, schemes have been approved for a new bar and rod mill integrated with the continuous billet mill in Lincolnshire and for further strip production at Corby. A rod mill at the works of Richard Johnson & Nephew has been approved and construction is already well advanced. The new window section mill at Darlington is coming into full operation. The plans for a new rod mill at the Lancashire Steel Corp. have been submitted. Plans have also been approved for developments in other finishing sections of the industry; for example, in tubes, wheels, wire and stainless steel.

Taken overall, the rolling mill programs already submitted would enable most of the production target figures to be reached, as in almost all cases the new building proposed is considerably greater than the net increase in production envisaged. There is in most instances a substantial reserve of existing capacity, some of which can be retained pending the completion of the balance of the plan.

Trend Toward Output Of More Hard Goods Seen in New England

Boston

• • • **Formerly two-thirds** of New England's industrial output consisted of soft goods like textiles and shoes. Today more than 50 pct of its production is hard goods such as machinery and machine tools. And the trend is still upward in hard goods.

Textiles are slipping, but production of textile machinery is at an all-time high, with leading makers booked through 1948. A sizable percentage of their backlog represents export business.

Paper machinery makers have all the orders they can fill during the next year and a half, at least. Printing equipment and parts makers will require 8 to 12 months to fill orders on books right now. Cuban and other interests have sugar machinery making companies sewed up for many months.

Pratt & Whitney Div. of United Aircraft Corp. has developed a new 650 hp aircraft engine and is urgently in need of machinists and helpers. Some 50 companies are turning out parts for atomic bombs, while gear and valve makers are sold far ahead.

Machine tool makers are not as busy as during the war, but are definitely more so than before the war, which is rather remarkable in view of the glut of government surplus tools thrown on the market at buyers' prices after the war. Among the industry there have been plant additions and acquisitions of plants built by the government during the war.

New England's lone blast furnace is assured profitable operation for a year, at least, something it never before experienced since it was built. Connecticut steel producers are going just as strong as they were during the war.

Big and little machine shops are going full tilt and there is a healthy demand for such shops.

Heavy and other hardware manufacturers are over the first of the postwar rush, but anticipate big business before summer ends.

Thus indications are that before the close of 1948 New England production will run considerably more than 50 pct hard goods, and very likely two-thirds.